



MINUTES OF THE PROCEEDINGS OF THE METEOROLOGICAL COMMITTEE.

1920-21.

(Sixteenth Year of the Meteorological Committee).

ONE HUNDRED AND SECOND MEETING.

*Air Ministry, Kingsway, W.C. 2.,
28th April, 1920.*

PRESENT :

THE PRESIDENT IN THE CHAIR.

THE DIRECTOR OF THE METEOROLOGICAL OFFICE.

THE HYDROGRAPHER.

MR. MEADOWCROFT.

LIEUT.-COL. LEWIS.

SIR THOMAS MIDDLETON.

COLONEL LYONS.

SIR ARTHUR SCHUSTER.

MR. McANALLY.

DR. WEDDERBURN.

MR. BERTRAM was in attendance.

A letter of apology for absence from Capt. Harvey was reported.

836. The Minutes 826-835 of the Meeting of 24th March, 1920, previously circulated in proof, were corrected and confirmed.

837. FIFTEENTH ANNUAL REPORT. (Minute 789). The Director reported that it was proposed to draw up a report for 1919-20 in the usual form, and that the reports from the observatories had already been received.

It was agreed that a draft of the report should be circulated to the members of the Committee before the next meeting.

838. ORGANISATION. **Sub-Committee upon the functions of the new Meteorological Committee.** The recommendations of the sub-committee appointed under Minute 828 were considered, and after amendment were approved as follows :—

FUTURE FUNCTIONS OF THE METEOROLOGICAL COMMITTEE.

1. The Meteorological Committee shall be constituted as follows :—

1 The Controller-General of Civil Aviation (Chairman).

1 Director of the Meteorological Office (ex officio).

2 Representatives nominated by the Air Ministry (including one for Finance).

1 The Hydrographer of the Navy representing the Admiralty.

1 Representative nominated by the War Office.

1 " " " Ministry of Agriculture and Fisheries.

1 " " " Board of Trade.

1 " " " Colonial Office.

2 " " " Royal Society.

1 " " " Royal Society of Edinburgh.

(A Secretary shall be appointed by the Chairman).

2. The Director of the Meteorological Office shall be appointed by the Air Council.

3. The Controller-General of Civil Aviation shall act as Chairman of the Committee, and shall be responsible as a member of the Air Council, for reporting to that Council. In his absence a Vice-Chairman, elected for the ensuing year by the Committee (*and selected from among the representatives of the Royal Society and the Royal Society of Edinburgh) at the last ordinary meeting in each year shall take the chair.

4. The members of the Committee shall be appointed by the Air Council, and, subject to the discretion of the authorities by which they are respectively nominated, will hold office for a period not exceeding five years ; but will be eligible for re-appointment.

5. The members of the Committee will not receive remuneration for their services, but travelling and subsistence expenses will be allowed in the case of members not residing in the metropolis.

*Added after receipt of letter from Royal Society, see Minute 843. (File 209854).

6. The Chairman shall call six ordinary meetings each year, and such extraordinary meetings as he shall consider necessary. The dates of the ordinary meetings in each year shall be approved at the last ordinary meeting of the preceding year. The notice of any extraordinary meetings, together with the Agenda to be transacted at such meeting, shall be circulated not less than a week before the date of the meeting.

7. The Committee shall :—

- (I) Receive the Annual Report prepared by the Director, and if approved, transmit it to the Air Council.
- (II) Consider and, if approved, transmit to the Air Council the financial programme in connection with the estimates for the coming year, and decide upon any important modifications of the programme which may be found desirable during the course of the year.
- (III) Review the scientific and observational activity of the Office, and consider such proposals as may be submitted to them by the Director for experimental work, the establishment of observatories or stations, and the allocation of the staff to be employed.
- (IV) Delegate, by special instructions to be recorded in the Minutes, such functions as they may think fit to the Director of the Meteorological Office, or to any Sub-Committee appointed for a special purpose.
- (V) Appoint Assistant Directors and Superintendents, after consideration of the recommendations of the Director.
- (VI) Submit annually to the Committee, appointed by the Council of the Royal Society under the Gassiot Trust, proposals respecting the allocation of the income from the Trust for magnetic and meteorological observations or other physical investigations in accordance with the Trust.

8. The Director of the Meteorological Office will act generally as adviser to the Committee on all meteorological and geophysical subjects, and shall be responsible for :—

- (I) The administration of Office and the execution of the duties delegated to him by the Committee.
- (II) The appointment of all members of his staff, other than those referred to in 7 (V) above.
- (III) The issue of all meteorological publications authorised by the Committee.
- (IV) Bringing before the Meteorological Committee, for their consideration, all matters of importance relating to the application, progress and development of the Science of Meteorology in which the Meteorological Service might share.
- (V) Referring to the Finance Department of the Air Ministry proposals for expenditure to be incurred by the Office before submission to the Committee.

It was further agreed that the recommendations should be submitted to the Air Council with the suggestion that, if approved, they should be communicated to the Royal Society before final adoption.

Appointment of Sub-Committee. (Minute 830). Reported—that the President had nominated the following to serve on the sub-committee appointed to consider the conditions of service of the staff of the Meteorological Office, The Controller-General of Civil Aviation, The Director, Mr. McAnally, Colonel Lyons, Colonel Beatty, Mr. Meadowcroft.

Proposal by F.M.1. for changing the method of accounting in the Instruments Division. (Minute 828). Reported that a conference on the method of accounting for instruments had been held on 27th April, and that the following proposals had been agreed to :—

1. That the plan recently adopted by the Air Ministry should be followed with respect to accounting for instruments supplied on the free list.
2. That a similar plan should be followed with regard to instruments supplied on repayment to observers or others, but that instead of making seven copies of the requisition to be distributed as suggested, the requisition form should be filled up in quadruplicate only, as with other requisitions, and that the Instruments Division should send to F.M.1. three copies of an invoice, one to be returned, one filed, and one forwarded to the purchaser as a claim for payment.
3. That the Director should be authorised to give instructions to the Superintendent as to writing stores off the charge of the storekeeper when the value of the item written off does not exceed £5, but that for items of higher value the concurrence of F.M.1. would be required.

Advisory Committee for Aeronautics. *Meteorology Sub-Committee.* The President raised the question as to whether any modification of the Meteorology Sub-Committee of the Advisory Committee for Aeronautics was necessary. The Director reported that the Committee met to consider the scientific aspects of meteorology which specially concerned Aviation, and that it was very desirable that it should be continued.

Approved.

Committee of the Meteorological Office, Edinburgh. (Minute 831). Submitted—the following minutes of a meeting of the Committee of the Meteorological Office, Edinburgh held on 16th April, 1920 :—

Committee for the Meteorological Office, Edinburgh.

FIFTH MEETING.

Minutes of Meeting held in the rooms of the Scottish Meteorological Society, 122, George Street, Edinburgh, on Friday, 16th April, 1920, at 4 p.m.

There were present :—

SIR NAPIER SHAW (in the Chair) ;
SIR R. B. GREIG ;
PROFESSOR R. A. SAMPSON ;
DR. C. G. KNOTT ;
DR. E. M. WEDDERBURN ; and
MR. A. WATT (Secretary).

There were also present by invitation :—

SIR W. LESLIE MACKENZIE, M.D., representing the Scottish Board of Health, and
MR. A. A. NORRIS, representing the Fishery Board for Scotland.

The death of Sir James Patten McDougall, K.C.B., was noted.

MINUTES.—The Minutes of Meeting held on 13th December, 1915, were approved.

STATEMENT AS TO RECENT DEVELOPMENTS.—The Chairman gave an account of the developments that had taken place since the Committee last met, and reported that in 1919, the Meteorological Office had been attached to the Air Ministry. The Meteorological Committee, still existed, though its exact composition and functions had not yet been determined, and it now included a representative of the Royal Society of Edinburgh.

AGREEMENT BETWEEN THE METEOROLOGICAL COMMITTEE AND THE SCOTTISH METEOROLOGICAL SOCIETY.—Dr. Wedderburn stated that in the altered circumstances the agreement between the Meteorological Committee and the Society which was made in 1913, was one which the Society could no longer carry out. After full discussion, approval was expressed of the following proposals which the Chairman proposed to bring before the Meteorological Committee, at its next meeting, to be held on 28th April, 1920.

1. The duties of the Meteorological Office, Edinburgh, as set out in No. 1 of the regulations of Minute 393, 30th April, 1913 (M.O. Circular 006), namely :—

- (1) The collection of trustworthy meteorological statistics from municipal and voluntary stations in Scotland, and the preparation of summaries for the meteorological reports issued by Government, and for the statistical reports of the Registrar of Births, Deaths, and Marriages for Scotland ;
- (2) The supply of meteorological information in reply to inquiries ;
- (3) The promotion by all available means of public technical instruction in meteorology, and of the application of meteorological science in the interests of the public health, of agriculture, fisheries and other industries ;
- (4) The promotion of meteorological researches, including researches on an international basis which depend on the organisation and compilation of observations ;

will be taken over by the Meteorological Office, Air Ministry, as from 1st April, 1920.

2. The staff which is at present employed for those duties by the Scottish Meteorological Society in accordance with No. 7 of the regulations, is as follows :—

- (1) *Andrew Watt, M.A.*, Assistant to the Secretary 1900—1907, Secretary 1907—present time. Salary £550, corresponding with that of an Assistant Superintendent with one year's seniority ;
- (2) *Miss Madge Crawford*, 7 years on the staff. Salary £140, corresponding with the initial salary of Clerk Computer ;
- (3) *Miss Alison E. Murray*, 6 months on the staff. Salary £80 with £10 a year increase, corresponding with that of a probationer.

Captain J. Crichton, Senior Professional Assistant, has been attached to the Office since his appointment on 1st January, 1920.

3. The work will form part of the duty of the Meteorological Office, Air Ministry, and the staff employed will be part of the staff of the Office, subject to the regulations of the Meteorological Committee.

4. The Meteorological Committee of the Air Ministry will maintain an Office in Scotland for the discharge of the duties hitherto assigned to the Meteorological Office, Edinburgh, and such other duties as may be approved by the Committee.

5. The Scottish Meteorological Society will agree to hand over its collection of books, maps, etc., to the Meteorological Office in trust for the maintenance of a meteorological library at the Office in Scotland with freedom of access to members of the Society and the general public, to consult the books, etc., under suitable conditions.

6. There shall be an advisory committee, of which the Director shall be Chairman; which shall include :—

One member nominated by the				Board of Agriculture for Scotland.
"	"	"	"	" Fisheries Board for Scotland.
"	"	"	"	" Scottish Board of Health.
"	"	"	"	" Royal Society of Edinburgh.
"	"	"	"	" Royal Society of London.
"	"	"	"	" Scottish Meteorological Society.

7. The Committee shall meet at least once a year, and shall have power to submit to the Meteorological Committee any proposals for the development of meteorological science.

8. The members of the Committee shall not receive remuneration for their services, but travelling and subsistence expenses will be allowed in the case of members not residing in Edinburgh.

OFFICE ACCOMMODATION.—It was reported that the rooms at 122, George Street, long occupied by the Society, had to be vacated by 28th May, 1920, and that the Air Ministry had requested the Office of Works to provide accommodation for the proposed new Office in Edinburgh. The Chairman stated that he had inspected premises which might be suitable, and the matter was remitted to Dr. Wedderburn to deal with.

Dr. Wedderburn proposed that the Scottish Universities should be represented on the Committee.

The following conclusions were approved :—

1. **Dr. A. Crichton Mitchell**, Superintendent of Eskdalemuir (Minutes 754 and 755) to be lent to act as Superintendent of the Edinburgh establishment for two years from 1st April, 1920, with special reference to the organisation of the work in Edinburgh and in Shetland in conjunction with that at Eskdalemuir.
2. Pending the formulation of an organisation **Mr. Andrew Watt** (Minute 783) to continue to take charge of the work on climatology and rainfall for the Meteorological Office, the Registrar-General for Scotland and other purposes as set out for 1913, in M.O. Circular 006 at his present salary, viz., £550 a year inclusive, taken as £377 + normal war bonus.
3. **Miss Madge Crawford**, to be taken on at the commencing rate of Clerk Computer or Clerk Assistant, viz. £75 a year + normal war bonus, or at her present salary £140.
4. **Miss Alison Murray**, to be taken on as probationer with weekly pay according to age.

839. **OFFICE STAFF. Superannuation** (Minute 830), Reported—that the following members of the staff retired from the service of the Office on 31st March :—Mr. T. Duncan Bell, Chief Clerk, who joined the Office in 1869, Mr. H. Harries, Assistant Superintendent in the Marine Division, who had been in the Office since 1875.

Malta. Selection of Superintendent. (Minutes 821 and 829). The Director reported that it was desirable to select a superintendent for the meteorological work of the Mediterranean at Malta at an early date, and submitted a list of the senior members of the professional staff in the order of seniority.

It was agreed that the appointment should be offered to such members of the staff as were most suitable in the order of their seniority, and in the event of none of these accepting that the offer should then be made to Capt. Bispham, M.A., B.Sc., who had served in the Meteorological Section, R.E., during the war, and had applied for appointment as Superintendent of the Edinburgh Office.

Resignation. Reported—the following :—**Miss E. F. Walker**, Librarian, Senior Professional Assistant (Minute 754) to take effect on 11th July (M. O. 28114).

Director's Orders for Confirmation: Reported—the following. **Appointments:** 1073 appointing **H. E. Forster** technical assistant at a salary of £75 and war bonus as set out in letter 25949. The appointment to date from 7th April, 1920, and to be terminable by three months' notice on either side.

1082 appointing **E. W. Bolton** Temporary Research Chemist for the Investigation of Atmospheric Pollution, at a salary of £250 per annum (inclusive of war bonus) from 7th April, 1920, during the absence of Mr. G. M. Watson (Minute 750). The appointment to be subject to one month's notice on either side.

1084 appointing, on recommendation of the Superintendent, **Mrs. Mary Stoddart**, House-keeper at Eskdalemuir (in place of Mrs. Murray, resigned) on the following terms :—

- (a) To have effect on and from 1st May, 1920.
- (b) Salary £65 per annum with normal war bonus (at present £59 10s. 0d.)
- (c) An allowance of 3s. per week from each Assistant in Residence.
- (d) The Housekeeper to meet the cost of Wages and Board for a maidservant.
- (e) Free quarters, coal and light allowed.
- (f) Appointment terminable by one month's notice on either side.

1085 allowing **James Stoddart** (Minute 625) handyman at Eskdalemuir, quarters in the Assistants' house as from 1st May, 1920, on the appointment of his wife as housekeeper. For these quarters a deduction of 3s. 6d. per week to be made from his wages. The arrangement to be terminable by one month's notice on either side.

1069 confirming the temporary appointment of **Miss D. G. Lee** (Minutes 715 and 754) and grading her as Clerk Assistant with seniority from the date of her appointment, 26th August, 1918.

Promotions. Recommended — that **Capt. F. Entwistle** (Minute 801), Senior Professional Assistant, be appointed Assistant Superintendent in the Forecast Service H.Q., for the work of S.E. England, as from 1st May, 1920.

Recommended also—that **R. Pyser** (Minute 754) Staff Assistant, be promoted Principal Assistant in the Forecast Division H.Q., as from 1st May, 1920.

Approved.

Supply of uniform for Office Keepers and Messengers, Reported—that uniform was required for Office Keepers and Messengers.

Mr. McAnally undertook to arrange for the supply.

840. OBSERVATORIES AND STATIONS. **Kew Observatory.** *Appointment of Caretaker.* (Minute 831). Reported—the following Director's order (1081) for confirmation :

O. J. Lampard, born 24th November, 1891 (Gardener at the Royal Gardens) had been appointed resident caretaker at Kew Observatory, his wife acting as housekeeper, at a salary of £1 7s. 6d. per week with normal war bonus. The basic salary to be increased to £1 11s. when the caretaker becomes efficient as observer. The appointment is terminable by one month's notice on either side.

The duties include :—

1. Responsibility for the building and premises after Office hours.
2. Care of the garden and grounds, as directed.
3. Such participation in the routine observations as the Assistant Director may direct.
4. The internal cleaning of the Observatory for which the assistance of a charwoman is provided.
5. Attendance on the resident staff, including cooking.
6. Duties incidental to the position as housekeeper.

The accommodation provided includes: kitchen, sitting-room, two bedrooms, with use of bath. Coal and light are provided.

Each resident observer pays to the housekeeper a sum at present fixed at 5s. per week for attendance.

Occasional absence from the Observatory after Office hours must be arranged with the resident observer, with consent of Assistant Director, so that there is always a responsible man upon the premises. The holidays are twelve days per annum, subject to satisfactory provision being arranged for caretaking and housekeeping, which the Office provides.

The appointment is to date from 29th March, 1920.

Approved.

Valencia Observatory. *Regulations for use of Motor Car.* Reported the following order for confirmation :

Order 1094 With the sanction of F. M. 2. (File 26459/20) the Superintendent is authorised to use his private motor car on official journeys and to charge 5d. per mile for the use of it, on the understanding that all claims will be supported by a certificate from the Superintendent that the mileage claimed was actually travelled on necessary duty, and that petrol had not been obtained from Government sources at a cheaper rate than the market one.

Approved.

Gale Warnings. *Proposed list of stations and introduction of night signals.* Reported—the following memorandum by the Assistant Director in charge of Forecasts: (File 25030).

1. The existing arrangements for the notification of storm warnings provide for the issue by the Meteorological Office of cones as daylight warning signals. The issue to approved stations is free of charge. There is no similar free issue of signal gear for night use.

The approved form of night signal, hitherto used in this country, is three lanterns hung at the corners of a triangular frame* and the free issue of lanterns and frame would necessitate the maintenance of the lanterns in good order by the Meteorological Office. A normal condition of free supply and maintenance of lanterns and frame would be that the responsible local authority should make provision of oil and wick for the lanterns and of any necessary gear for hoisting.

There are certain salient points which are of importance to general shipping rather than to local shipping, and for these the Meteorological Office would be the appropriate authority to bear the cost of all requisites, whether they were provided direct or by the Lighthouse Boards or by the Coastguard Service.

The places suggested for the provision of night signals are shown below. Those marked with a † are places which should be maintained by the Meteorological Office. Night signals are already displayed at the Port of Newhaven.

Scilly†	Dover	Spurn Head†
Plymouth	Beachy Head†	Grimsby
Lizard†	North Foreland†	Flamborough Head†
Southampton	Shoeburyness (M.O. station being arranged).	Middlesborough
Prawle Point†	Felixstowe (M.O. Stn.)	Tynemouth†
Portland†	Tilbury†	Rosyth
Newhaven	Yarmouth	St. Abb's Head†
St. Catherines Point†	Tory Island†	Leith
Dundee	Malin Head†	Point of Ayre†
Girdleness†	Greenock	Holyhead†
Fraserburgh	Belfast	St. Anne's Head†
Peterhead	Achill Head†	Lundy Island†
Wick†	Bray Head†	Fleetwood
Lerwick†	Kinsale (Old Head)†	Liverpool
Cape Wrath†	Queenstown	Fishguard
Stornoway	Rosslare	Barry
Barra Head†	Kingstown	Cardiff
Oban	Mull of Galloway†	Bristol
Glasgow		

If the proposal is approved, the Port Authorities at the remaining places would be invited to participate in the scheme with a view to making the storm warnings more immediately available to the sea-faring community than is at present the case.

2. At present cones are issued only for Coast Stations. It appears desirable that they should also be provided at aerodromes which at present receive the warnings.

The cones should be provided free of charge on condition that arrangements were made at the aerodrome for hoisting them. Electric lamps could conveniently replace oil lanterns for night signals in most places.

E. GOLD.

1/4/20.

The recommendation of paragraph 2 was approved, and with regard to paragraph 1 it was agreed that the hoisting of night signals was essential, and that the Hydrographer and the Board of Trade should be consulted as to the details and as to what form the signal should take.

Balloon Investigations. (Minute 829). The Director read a letter from Squadron Leader Harries, stating that at present no spherical ballooning was being carried out in the Service but that it was understood that the Director of Training and Organisation was making arrangements to include it in the training (File 27481).

Ross-on-Wye. An application (M.O. 27823) from Mr. Parsons of Ross-on-Wye, asking that the station might become a telegraphic reporting station, presumably without fee but with free telegrams, say twice daily, was reported; and it was recommended that as the Office was in need of inland telegraphic stations that the request should be granted.

Approved.

South-Stack Lighthouse. Reported—a letter (M.O. 28490) from Trinity House, stating that certain alterations were necessary at the South Stack Lighthouse to permit the Storm Warning Cones to be hoisted without risk of accident. The cost of the alterations is estimated at £30 and the Elder Brethren consider that £15 should be paid by the Meteorological Office.

* A modification was adopted at the Conference at Rome in 1913, on the recommendation of the Commission for Maritime Meteorology, London 1912. This consists of three lamps in a vertical line, with a distance of 7 feet between the middle lamp and the top and bottom loops.

It was agreed that the payment was contrary to the practice of the Office, and that some other means of meeting the situation must be devised.

Meteorological requirements of the War Office. (Minute 829). Read—the following letter from the War Office :

42/A.S./280. (D.5.) M.O. 27828.

WAR OFFICE,
LONDON, S.W.1.

March, 1920.

Sir,

With reference to the Director of Meteorology's letter, 26644 dated 26th February, 1920, I am commanded by the Army Council to state that they have now formulated a definite policy with regard to Chemical Warfare. At the present time final approval has not been obtained, and pending this it is not possible to furnish the Air Council with any details.

I am to say, however, that the policy is to continue research and retain the existing Station at Porton for experimental purposes.

In this connection the provision of adequate meteorological assistance is essential.

I am, therefore, to request the Air Council to state whether they can provide personnel for this purpose, and I am to suggest that one Meteorological Officer and two Assistants be allocated to Porton to inaugurate the Service.

I am, &c.,

B. B. CUBITT.

The Secretary,
Air Council.

The establishment of a station at Porton was approved in principle, and it was agreed to establish a station when provision could be made for staffing it.

Committee on Geophysical Investigations in Shetland. (Minute 829). Reported—that a committee had been formed (Order 1079) to report from time to time on details of the programme and arrangements for the investigation of aurora, etc., in Shetland in connection with Amundsen's expedition and that the following minutes of the first meeting had been submitted.

Minutes of the First Meeting held at the Meteorological Office, South Kensington, on 13th April, 1920, at 3 p.m.

Present :—

Dr. Chree (in the chair).
Mr. Lempfert.
Lt.-Col. Gold.
Dr. Crichton Mitchell.
Mr. Richardson.
Mr. Corless.

Mr. Corless was appointed Secretary of the Committee.

Dr. Chree gave a resumé of the suggestions which had been made to meet the request of the Norwegian Government that this country co-operate in the Scientific work arising out of Amundsen's Polar Expedition. He stated that the project to send a British Expedition to Jan Mayen had fallen through, that it was now suggested to establish a geophysical and meteorological observatory in Shetland.

The Committee proceeded to consider the programme of work of such an observatory and the apparatus which would be required to carry it out. The work was considered under the following headings :—

- I. Auroral Photography.
- II. Terrestrial Magnetism.
- III. Earth Current.
- IV. Atmospheric Electricity.
- V. Meteorology.

I. AURORAL PHOTOGRAPHY.

It was recommended that the plan adopted by Professor Störmer of Christiania, who had been in communication with Dr. Chree on the subject, should be followed as far as practicable. Two stations separated by a base of suitable length, 20—25 kilometres, are essential but a third station is highly desirable, according to advice received from Professor Störmer, in order that measurements may also be made with a larger base line. The stations must be in direct communication with one another while experiments are in progress, preferably by telephone, but the possibility of maintaining communication by wireless was also raised and Mr. Lempfert stated that Mr. Watson Watt was reporting on this matter.

Immediate action was recommended as follows :—

(1). The placing, through Professor Störmer, of an order for three special cameras of the latest design. The cost of these is stated to be about 500 kroner (about £25) each. Professor Störmer states that unless the order is placed soon there may be difficulty in obtaining delivery before the next

season for observations sets in. The Committee wish to point out that even if the Shetland scheme fails to materialize, useful work could be done with these instruments at Aberdeen and Eskdalemuir.

(2). That letters be written to the Post Office and Admiralty to elucidate information as to existing telephone facilities in Shetland. Such information is needed before the question of site for the observatory can be adequately considered.

(3). It was also recommended that a letter should be written to Professor Fowler, acquainting him that a proposal to establish an Observatory for auroral observations is under consideration and asking for suggestions regarding spectroscopic work which could be usefully undertaken. Similar letters should be addressed to Professors Lindemann and Chapman, inviting suggestions for any special observations.

II. TERRESTRIAL MAGNETISM.

It was recommended that the work should include continuous records of declination, horizontal and vertical force and also absolute magnetic measurements. Observations of pulsations of vertical force by the method now in use at Eskdalemuir should also be included.

The Krogness magnetograph now made by the Office should be used, but as no experience of the practical working of these instruments is available, other magnetographs should also be provided. The magnetographs formerly used at Falmouth, and now at Eskdale, might serve after overhaul. In order that these instruments may be available when required, it was recommended that they be sent for overhaul immediately.

It was noted that two new dip circles are available at Kew Observatory, one of which could be supplied.

It was recommended that a new unifilar magnetometer be purchased.

As regards observations of pulsations of vertical force, cable for the coil is available at Eskdalemuir.

It was recommended that the Admiralty be asked for the loan of two galvanometers, believed to be available, and of a megger for the records of pulsations of vertical magnetic force. Dr. Crichton Mitchell stated that the remainder of the recording apparatus required for these observations could be made at Eskdalemuir, provided due notice of the requirements were given to him.

Dr. Mitchell suggested that it is desirable that a detailed magnetic survey of Shetland be carried out during the summer months as opportunity offered, since during these months auroral photography cannot be carried out.

III. EARTH CURRENTS.

It was recommended that two lines, mutually at right angles, with terminal plates and recording moving coil galvanometers be installed. The cable for such lines is available at Eskdalemuir, and it is suggested that the galvanometers may be borrowed from the Admiralty. The two records should be taken on a single drum and a single sheet.

IV. ATMOSPHERIC ELECTRICITY.

It was recommended that a water dropper with suitable recorder be adopted as the standard instrument, but that an ionum collector be also supplied to be used when the water is frozen.

It was recommended that a Wilson apparatus for observing earth air currents, and an Ebert apparatus for determining the ionization of the air be supplied, if obtainable.

The possibility of the investigation of penetrating radiation was also mentioned but no resolution was adopted.

V. METEOROLOGY.

It was recommended that a full contributive station be established in due course with pen recorders for pressure, temperature, humidity and rain, pressure tube anemometer, pilot balloon equipment, etc. This is not regarded as essential for the geophysical investigations which are undertaken in the first place in connexion with the Norwegian scheme, but it would be necessary to instal at least a third order meteorological station with a selection of recording instruments in the first place to give meteorological data to be used in elucidating the geophysical results.

TIME-KEEPING AND GENERAL.

Accurate Time-keeping is essential, and that is best achieved by observing the Eiffel Tower Time Signals. It was agreed that Mr. Watson Watt be requested to consult Dr. Chree and draw up a report on the arrangements for receiving time signals, and also on the possibility of utilising or suggesting any special arrangements which it may be necessary to make with the wireless station at Lerwick for possible experiments directed towards determining the height of the "conducting layer" of the atmosphere.

It was recommended that a wireless receiver set and two chronometers be provided for the Expedition. Details of the wireless receiver set would be determined on Mr. Watson Watt's report. It might take the form of an apparatus for determining the direction of thunderstorms, if suitable. This apparatus might also be used for receiving signals sent from other stations in connexion with the determination of the height of the "conducting layer."

It was recommended that enquiries in the following subjects be put in hand as soon as possible:—

1. The direction in which the area of aurora in Shetland usually lie. (Upon this depends the decision as to the orientation of the line joining the stations which should be at right angles to the prevailing direction of auroral bands for most advantageous working).

2. Statistics of cloud in Shetland.

3. Statistics of fog in Shetland.

4. Statistics of frost in Shetland.

It was also agreed that Dr. Saxby, of Balta Sound, be asked whether he could supply information regarding (1) and, that he be also asked whether he has any suggestions to offer regarding the relative cloudiness or foginess of different parts of the Islands.

SITE.

The letter from Mr. Saxby offering facilities for the erection of huts, etc., on his property at Balta Sound was read.

The choice of site for the magnetic work must be influenced largely by geological conditions as it is essential to avoid the proximity of magnetic rocks. Preliminary enquiries have been made by Dr. Chree in London and by Dr. Mitchell in Edinburgh. Before a final choice of locality is made specimens of rocks from the neighbourhood of the proposed site should be collected and tested. Dr. Chree reported a letter from Dr. Flett, Director of the Geological Survey, Edinburgh, stating that he proposed to visit Shetland next week for the purpose of collecting specimens.

Dr. Chree was asked to specify the localities mentioned below as places for special examination.

The choice of site must also be guided by facilities for communication by telephone and otherwise regarding which enquiries should be addressed to the Post Office and Admiralty.

The following sites have suggested themselves for consideration :—

1. Neighbourhood of Lerwick.
2. Burra Ness in Delting Parish on Mainland.
3. The Island of Yell (Burravoe and Cullivoe).
4. Balta Sound.

It was recommended that representatives of the Committee should be sent to Shetland to report as soon as possible after completion of the necessary preliminary enquiries in regard to the relative advantages of the suggested sites, or others if need be, and to obtain information on such points as :—

1. The housing of the observatory.
2. Accommodation of the staff.
3. Means of intercommunication.
4. Water supply.
5. Proximity to electric undertakings or other enterprises likely to affect the work, either advantageously or disadvantageously.

STAFF.

Two stations are regarded as essential and three as desirable. For two stations the bare minimum of staff is five, namely, one superintendent, one professional assistant, two staff assistants, one boy clerk, of which three would be situated at the head station and two at the second station. These stations should carry out auroral photography, the running of the magnetographs and the absolute magnetic observations, also meteorological observations at a station of the third order. They might possibly be able to add records of pulsations of magnetic force and of earth currents.

Observations of atmospheric electricity and wireless work could be undertaken if one extra professional assistant were available.

The addition of a full contributive meteorological station would involve further considerable additions to the staff.

ADDENDUM.

Since the above meeting was held a letter has been received from T. W. L. Spence, Esq., from which the following is extracted :—

"I see from the *Scotsman* of Saturday, that the estate of Burravoe (4,000 acres) is for sale. There is in the middle of the village—or rather collection of crofts—a high knoll on which the former proprietors (Bruces of Burravoe) built a house as an "observatory," by which must be understood a place from which earth, sea and sky could be seen from all points. The house was occupied when I was there in 1913, but in what condition I do not know. It might be found adaptable to the special requirements of observers."

Mr. Spence adds, perhaps as an afterthought : "There is good sea and brown trout fishing and snipe shooting in most parts of Yell."

Reported also—a letter (M.O. 28579) from Dr. Hesselberg stating that 1921 would be the most important year for the co-operation with Amundsen's expedition.

It was agreed that the establishment of the station should be proceeded with, and that authority should be given to Dr. Mitchell to visit Shetland with a view to selecting a suitable site for the station.

The Hydrographer reported that a magnetometer was probably available at the Admiralty.

841. PUBLICATIONS. **Resumption of Exchange with enemy countries.** Reported that on the authority of Minute 824, the exchange of publications had been resumed with the following institutions in former enemy countries :—

- Meteorologisches Observatorium, Aachen.
- Meteorologisches Institut, Berlin.
- Meteorologische Station, Bremen.
- Hessisches Landesamt für Wetter-und Gewässerkunde, Darmstadt.
- Säch. Landes-Wetterwarte, Dresden.
- Meteorologisch-Geophysikalisches Institut, Frankfurt a/M.
- Deutsche Seewarte, Hamburg.
- Hauptstation der Erdbebenforschung am Physikalischen Staatslaboratorium Hamburg.
- Central-bureau für Meteorologie und Hydrographie, Karlsruhe.
- Geophysikalisches Institut der Universität, Leipzig.
- Preussisches Aeronautisches Observatorium, Lindenberg.

PUBLICATIONS—*continued.*

B. Landeswetterwarte, Munich.
 Observatorium, Wilhelmshaven.
 Central-anstalt für Meteorologie und Geodynamik, Vienna.
 Oösterr-Gesellschaft für Meteorologie, Vienna.
 Meteorológiai és Földmágneségi Intezet, Buda-Pesth.

Also with the following institutions in territories that have passed from enemy to allied or independent states :—

Observatorium du Technische Hochschule, Lemberg.
 Ufficio Idrografico, Pola.

And with certain institutions formerly belonging to the Russian Empire :—

Tartu Ulkooli Ilmade Observatoorium, Dorpat.
 Meteorologiska Central-anstalt, Helsingfors.

Authority was given for the following to be published as Professional Notes :

An Analysis of the Rate of Ascent of Pilot-Balloons by R. P. Batty, B.A.

Report on two Pilot-Balloon Ascents at Shoeburyness by N. K. Johnson, B.Sc.

Report on Visibility at Cranwell by W. H. Pick, B.Sc.

Reported that the following publications which were out of print were still in demand :

M.O. 214 A. **Monthly Normals.**

M.O. 210 A. **Geophysical Memoir No. 1.** The Effect of the Labrador Current upon the Surface Temperature of the North Atlantic by Capt. M. W. C. Hepworth.

M.O. 223. **Computer's Handbook**, Section II. (i.) (in process of revision).

Copies of the following publications which had been issued since the last meeting were laid on the table :—

M.O. 210D. **Geophysical Memoir, No. 14.** Soundings with Pilot Balloons in the Isles of Scilly, by C. J. P. Cave and J. S. Dines.

M.O. 210E. **Geophysical Memoir, No. 15.** Climate and Weather of the Falkland Islands and South Georgia.

M.O. 236. **Book of Normals**, Section II. Weekly, Monthly, Quarterly, and Seasonal Normals for Districts.

Also proofs of the following :—

M.O. 232J. **Professional Notes, No. 10.** Methods of Computation for Pilot Balloon Ascents.

Meteorological Charts for the Southern Ocean, between the Cape of Good Hope and New Zealand.

842. **DIRECTOR'S REPORT AND ACCOUNTS. Transfer of Accounting** (Minute 828). As from 1st April, 1920, the accounting for the Meteorological Office has been taken over by the appropriate departments of the Air Ministry (File A34186). The departments appropriate to the several items are as follows :—

Salaries, Wages	}	F.E.
Travelling Expenses		
Rent, Heating and Lighting		
Insurance		F.M.2.
Postage, Telephones and Telegrams		F.P.1.
Furniture		S.1.
Books, Stationery, Library		S.2.
Instruments		F.M.1.
Superannuation		F.P.1. & S.1.

The account at the Bank of England will be closed as soon as the Accounts for the year 1919-20 have been presented.

Official Postage (Minute 828). As from 1700 on Monday, 12th April, 1920, Meteorological Office mails have been accountable as Air Ministry mails, and outward packets have travelled under Air Ministry franks. The Meteorological Office franks have been surrendered.

Course of Instruction for R.A.F. Officers.—At the request of the Director of Training, arrangements have been made, in conjunction with the Imperial College, for a course of instruction to be held at the Meteorological Office, South Kensington, with a view to training R.A.F. officers for meteorological duties in the Middle East.

The course will extend over a period of 5 months from April to August, and will include preliminary instruction in the use of instruments, plotting of observations for the drawing of a daily weather map, practice in the use of instruments at Kew Observatory, the study of the

application of meteorology to navigation at Calshot, and practice in map work and general instruction at Headquarters. Lectures have been arranged at the Imperial College on Preliminary Physics, and at the Office on dynamical meteorology, the general circulation of the atmosphere, and the meteorological aspects of navigation. (File 27950).

Courses of Instruction at Cranwell and Calshot.—Courses of instruction have been arranged at Cranwell for Cadets in their second year, and at Calshot for pilots studying Aerial Navigation. The courses extend over a period of from 8 to 12 months, and consist of lectures delivered by the officer-in-charge of the meteorological station, supplemented by instruction in use of instruments and methods of observing. A syllabus of lectures has been drawn up for Cranwell by Capt. W. H. Pick, and for Calshot by Capt. H. W. L. Absalom. (File 26515).

Reports from Cross Channel Steamers. Reported—that arrangements were in progress for a trial to be made for obtaining weather and temperature reports from cross channel steamers; that the trial would begin on 1st May, 1920.

Meteorological Survey of the Oceans. Submitted—the following memorandum by the Marine Superintendent :—

State of Meteorological Survey of the Oceans.

The position as regards (1) Collection, (2) Computation and (3) Publication of values of wind, weather, ocean currents, atmospheric pressure, air temperature and sea surface temperature at present, April, 1920, is as follows :—

1. Collection.

There are 9,176 Meteorological Logs now in the Marine Division for all parts of the ocean dating from 1837.

At present we have 106 ships observing with tested instruments, and sending in Meteorological Logs; there are also upwards of 109 ships observing with their own instruments (many of these instruments are untested and of doubtful character) sending in Forms 121, 121A and 122, which contain two sets of observations daily.

The number of observing ships can be increased considerably when tested instruments are available for loan; we are at the moment some 144 sets of instruments short of the pre-war establishment.

With a view to improvement of data, the Meteorological Log, original note book, and Form 121A, have been revised and brought up to date.

With a view to the future efficiency of observers the Cadets' Meteorological Log has been published, and the Officers' Mercantile Marine Training Establishments are co-operating in training Marine Observers.

A series of articles is being published on the back of the Monthly Charts.

A cloud plate has been distributed to all observing ships.

I am personally preparing at home a simple manual of instruction for Midshipmen, Apprentices and Cadets of the Mercantile Marine. The Marine Observer's Handbook is very much in need of revision, particularly with regard to visibility and fog scales, sea disturbance, instructions regarding pumping of the Barometer, current observation, rain gauge, clouds, W/T weather reports, etc., all of which are now being prepared.

2. Computation. Old System, i.e., prior to 1st April, 1920.

There are few or no logs which have been exhausted by extraction into data books.

Data are in data books as follows, which have not been published :

Squares 493 to 503 from 1855 to 1900.

N. Atlantic between Lat. 20° N. and Lat. 60° N. from 1895 to 1917, September only completed, books for other months opened.

Between Lat. 20° N. and Equator westward of the 40th meridian and squares 1 and 36, 1855 to 1871.

Squares 248, 249, June to September only, all data to 1918.

New System. April 1st, 1920, onwards.

The new system was commenced on receipt of the new data books, April 1st, and the attached chart speaks for itself. The figures upon it indicate the number of sets of observations extracted in each square, only four logs have so far been exhausted. Logs are in each case exhausted completely into data books.

The method of correction has been carefully gone into. Tables, where possible, have been made and everything has been simplified for the extractors.

Already queries have been settled, which, had extraction taken place months, or years after the log came in, could not have been easily decided by reference to the observers.

3. Publication.

The following data has been published from Data books :

N. Atlantic—M.O. 20. Square 3, 1855 to 1871.

M.O. 27. Charts of Meteorological Data Lat. 20° N. to 10° S., Long. 10° to 40° W., 1855 to 1871.

- S. Atlantic*—M.O. 168. Wind Charts, including Barometer and air temperature, 1855 to 1899.
- Cape of Good Hope*—M.O. 43. Meteorological Charts Ocean district adjacent to Cape, 1855 to 1880.
- Arctic*—M.O. 221. Monthly Meteorological Charts, Baffin Bay and Davis Strait. Lat. 60° to 80° N., Long. 40° to 90° W., 1855 to 1913.
- Mediterranean*—M.O. 224. Monthly Meteorological Charts, Mediterranean Basin, 1900 to 1914. (Wind, Sea Temperature and Weather only, in data books). This publication was not published by the Marine Division.
- Red Sea*—M.O. 106. Meteorological Charts of the Red Sea, 1869 to 1892, also M.O. 181.
- Indian Ocean*—M.O. 181. Monthly Meteorological Charts of E. Indian Seas, 1855 to 1904. North of Lat. 15° S., Lat., 15° S. to 33° S., 1855 to 1908.
- China Seas*—M.O. 181. East of Long. 100° North of Equator, 1855 to 1917.

The following data have been published *from plottings on working charts*. Judging by these working charts, they are not in suitable form to embody in new averages :

- "Sea Surface Temperature of the Atlantic, Indian and Pacific Oceans" 0.59. Published 1884. Months : February, May, August, and November, to 1882.
- "Charts of Mean Barometric Pressure of the Atlantic, Indian and Pacific Oceans" 0.76. Published 1887. Months : February, May, August, and November, to 1883.
- "Charts of the Southern Ocean between the Cape of Good Hope and New Zealand" 0.123. Published 1899. Each Month : Barometer, Wind, Air and Sea Temperature, and Fog. (Observations up to 1895).
- "Monthly Current Charts of the Indian Ocean" 0.124. Published 1895 to 96. (Observations 1830 to 94).
- "Monthly Current Charts of the Atlantic Ocean" 0.132. Published 1897. (Observations 1830 to 94).
- "Quarterly Current Charts of the Pacific Ocean" 0.134. Published 1897. (Observations 1830 to 94). Months : February, May, August, and November.
- "Monthly Current Charts of the Mediterranean." (Observations 1830 to 94). Published only in 0.149.

With a view to future efficiency it is submitted that a definite policy may be adopted and the following suggestions are therefore put forward :

That (a) All data extracted be tabulated and published for all Oceans in book form yearly from April, 1920, starting year ending 1922.

(b) The number of sets of instruments be brought up to the pre-war establishment of 250 in the next two years.

(c) Steps to be taken to induce Shipowners to supply new ships with tested mercurial barometers as part of the ship's outfit.

(d) The Board of Trade be communicated with, with a view to getting a standard ship's log book established by law including instructions and columns for essential meteorological data and space provided for Hydrographic notes, besides the navigation and disciplinary purposes of the ship.

I am of opinion that if this suggestion were put forward to ship-owners and masters, there might be found a very large number who would welcome it.

Once introduced, an enormous amount of labour would be saved to officers who observe for the Office ; there would be economy in cost, and the means of obtaining reliable data would be increased, and in time there would be no need to ask Officers to keep special logs in addition to the ship's log.

At present each company has their own form of log ; there is also the official log, making in all five logs, not counting the engine room register, kept by Meteorological Office observing ships. This number includes rough books.

(e) For the next two years no attempt be made to produce new charts, in order that the Division may exert its entire efforts to improving observations, methods, and existing charts ; that in fact this would be a period of reconstruction with educational methods.

(f) The staff may be brought up to establishment and increased. The new system of data extraction will in time reduce work to an enormous extent. An idea may be had of the grinding work of the old method by this example ; three extractors working steadily from May, 1918, to January, 1919, completed one month of the N. Atlantic for 23 years ; it would therefore take three men nine years to extract all 12 months for the same period.

(g) W/T reports when introduced be used in conjunction with other data and the Synoptic and old methods be reconciled and used together wherever possible.

(h) That in the interest of aviation, Marine Observers should be treated with the utmost sympathy and their traditions and customs be respected.

L. A. BROOKE SMITH,

Marine Superintendent.

23rd April, 1920.

It was agreed that it was desirable to form a Sub-Committee for Marine Meteorology, and the following names were suggested and approved: The Hydrographer, Colonel Lyons, a representative of the Colonial Office, and of the Board of Trade, Mr. Lempfert (Assistant Director, Contributive Stations), the Superintendent of the Marine Division.

Audit of Stock of Instruments. Reported—that the instruments in stock on 31st March, 1920, had been audited by Mr. C. W. Lamb, under the instructions of Mr. Lempfert. (File 53336). A comparison of the remains thus certified with the remains on charge as shown in the store ledger, reveals the following discrepancies:—

AUDIT OF INSTRUMENTS — March 31st, 1920. — LIST OF DISCREPANCIES.

Value of excess of Stock over Ledger.				Value of excess of Ledger over Stock.			
		£	s. d.			£	s. d.
Barometer, Marine, 1	...	8	8 0	Anemometer, 1	...	3	0 0
" Mercantile, 1	...	4	4 0	Aneroids, Mk. II., 3	...	1	11 6
" Station, 1	...	3	12 6	" Mk. I., 1	...	1	2 0
Balloons, paper, 1	...	1	3	Bottles, 1 and 2oz., 4	...	0	8
Bottles, clock oil, 2	...	2	6	" water, 11	...	1	10
Boxes, Hydrometer, 3	...	2	6	Brackets, Barog., 4	...	3	0 0
Cases, Copper, 1	...	1	10	Boxes, 6 Divsn., 4	...	16	0
Cases, Slide Rule, 1	...	2	6	Brasses, telegram, 1	...	2	4
Cursors, 1	...	5	0	Boxes, Post, 13	...	19	0
Cell Leclanché, 1	...	2	0	Candles, 519...	...	8	6
Frame Weather Report	...	1	10 0	Goggles, 2	...	6	0
Gauge, rain gauge, 1	...	1	0	Lantern, Cart 1	...	5	0
Jar, Hydrometer, 1	...	1	6	Batteries, No. 800, 6	...	no value.	
Keys for Clocks, 6	...	11	6	Pens, Hyetograph, 1	...	1	0
Lamp Electric, 1	...	7	0	" Rain gauge, 1	...	2	0
Lanterns, Paper, 206	...	1	5 9	Phials, ink, 24	...	4	0
Measures, 5"mm, 2	...	9	0	Rods, Zinc, 2	...	1	0
Voltmeter, 1	...	6	6	Screen, Shipboard, 1	...	10	0
Nephoscopes, Besson, 3	...	13	0 0	Scales, grad., 4	...	1	4 0
Frames, S.S. Recorder, 1	...	4	0 0	Sets, lighting, 1	...	3	0 0
Screens, ordinary, 2	...	6	0 0	Therms, ordinary, F., 7	...	2	2 0
Therms, minimum, 4	...	no value.		" max., 1	...	8	0
" solar, 6	...	10	0	" grass., 1	...	7	0
" earth, 1	...	13	9	" max., 2	...	8	0
" setting, 3	...	10	6	" ordinary, abs., 3	...	18	0
" ordinary, 6...	...	1	0 0	" max., abs., 1	...	7	6
" " 6...	...	18	0	" Psychrom, 1	...	7	6
" minimum, 1	...	5	0	Tubes, glass, 2	...	1	2
Torch, 1	...	0	6	Unions, Hydrogen, 1	...	1	6
Therms, S.W., 1	...	5	0	Valves, F.A., 2	...	1	0 0
Wire, Anemo, 63 yards,	...	7	10	Cases, Packing, 20 × 9 × 10, 9	...	3	3 0
Cases, packing, 69 × 11 × 12, 7...	...	7	0 0	Balloons, 48", 107	...	2	13 6
" " 47 × 21 × 21, 1...	...	12	0	" 70", 970	...	36	0 0
" " 22 × 11 × 11, 2...	...	18	0	Anemometers, S.P. 2	...	5	18 0
" " 16 × 14 × 12, 7...	...	1	15 0				
" " 24 × 14 × 14, 15...	...	9	0 0				
" " 31 × 22 × 22, 6...	...	1	10 0				
Balloons, 90", 314	...	34	0 0				
Boxes, battery, 9	...	9	0 0				
Hoods and Reflectors, 1	...	1	0 0				
Levels, spirit, 1	...	3	0				
		114	2 11			70	10 0
		70	10 0				
		43	12 11	Value of excess of Stock over Ledger.			

It was reported that the discrepancies were largely due to the removal of the Instruments Division from Cromwell Road, occurring simultaneously with the delivery of a large accumulation of stores from Kidbrooke.

The stock is valued at purchase prices (or present values if unserviceable) at £21,932 8s. 2d.

Authority for taking on charge of the excess stores and for striking off charge the stores in defect is required.

It was agreed that the matter should be taken up with F.M.I.

Repair of Instruments broken at the National Physical Laboratory. Reported.—the receipt by Mr. J. J. Hicks of two letters from the National Physical Laboratory, informing him of damage by laboratory officials to two barometers belonging to the Office, which had been repaired by Hicks and sent to the Laboratory for test. It is pointed out in the letters that the Laboratory is not responsible for damage to instruments incurred while under test. (File 53813).

The damages in the two instances are assessed at 30s. and 7s. respectively. The Laboratory writes as follows :—

“ At some time in the past, probably by the maker who repaired the instrument on the occasion of its last test here, one of the scales of the barometer has been erased, and in consequence the metal tubing is now very thin in places near the slot along which the vernier moves.

By an accident during the course of the present test, an observer pressing against the thin portion of the metal tubing caused the metal to kink and started a small crack with the result that the vernier does not now run smoothly along the whole length of the slot.

We have discontinued the test on the instrument and propose giving the barometer to your messenger for your attention.

We do not feel that any blame attaches to the observer in this instance as the edge of the slot had been thinned down so excessively. No doubt you will arrange with the Meteorological Office as to the necessary repairs.

J. E. SEARS,
for the Director.”

and

“ I regret to inform you that the Fahrenheit thermometer attached to Marine Barometer A. 418, has been broken here. We should be glad if you would kindly replace it at your early convenience. The cost of replacement is not recoverable from the Laboratory.”

It is understood that most makers insure instruments against breakage which are sent to the Laboratory for test, the Laboratory itself arranging the policies. J. J. Hicks, however, will not participate in the scheme, so that in these two cases the expense of making good the damage, will fall upon the Office.

It was agreed that the Office pay for the repairs in question.

Advisory Committee for the work on Rainfall. Reported—that authority for appointing a Committee on rainfall had been given in Minute 799. The following names were put forward and approved : Sir Thomas Middleton, representing the Ministry of Agriculture ; Dr. Wedderburn ; Mr. Lempfert ; the Superintendents of Statistics, British Rainfall, and Instruments.

It was further agreed to invite Mr. H. Mellish, C.B., D.L., a former trustee of the British Rainfall Organization, to join the Committee.

Conference on Reports by Wireless Telegraphy from Merchant Ships. (Minute 835.) Reported—that a meeting of the sub-committee appointed for the consideration of methods of collection and dissemination of meteorological information by wireless telegraphy from and to mobile stations had been called for April 28th, at 3 p.m.

Accounts.—Submitted—the following Statement of the Bank Account in the Cash Book :—

	£	s.	d.
Balance on 23rd March, 1920	4187	18	3
Receipts from 24th March, 1920	12261	12	5
	16449	10	8
Cheques drawn from 24th March, 1920	13819	19	0
BANK BALANCE on 31st MARCH, 1920	£2629	11	8

NOTE.—From 1st to 27th April, 1920, the sum of £368 9s. 9d. has been received by the Meteorological Office and handed over to the Air Ministry.

Submitted—the following Statement of Account for the twelve months ended 31st March, 1920, prepared for audit by the Comptroller and Auditor-General :—

RECEIPTS.				EXPENDITURE.			
1918-1919. £ s. d.		1919-1920. £ s. d.		1918-1919. £ s. d.		1919-1920. £ s. d.	
99 14 10	Balance from year 1918-1919 ...	—	108 10 0	1,000 0 0	Adviser and Director... Acting Director— Col. H. G. Lyons ...	—	1,411 5 0
22,500 0 0	Parliamentary vote	—	47,000 0 0	147 16 3	OFFICE SALARIES (in- cluding Insurance):	—	13 8 9
7,250 0 0	Vote of Credit ...	—	19,032 3 3		Monthly ...	26,134 8 2	
	DEPARTMENTAL EX- PENSES REPAID:			15,015 5 6	Weekly ...	3,254 0 3	
42 11 11	Forecasts, &c. ...	77 4 6		3,285 7 6	EXPENSES OF OFFICE:		29,388 8 5
	Marine, Statistical, and Administra- tive ...	108 2 9		702 16 10	Rent, Heating, and Lighting ...	717 8 0	
1,624 7 7	Instruments ...	669 8 3	854 15 6	44 7 9	Furniture and Equip- ment ...	111 5 7	
	INCIDENTAL EX- PENSES REPAID:			14 10 4	Library ...	27 15 4	
486 12 7	D.W. Report ...	844 10 7		57 5 6	Insurances and Re- pairs ...	15 0 0	
256 9 8	Divisional ...	165 16 10		480 12 9	Incidental Expenses and Consumable		
22 13 2	Advertising Ac- count ...	7 8 9	1,017 16 2	7 10 0	Stores ...	981 14 11	
	STATIONERY OFFICE		190 5 8		Advertising Account	5 10 8	1,858 14 6
145 17 4	TELEGRAPH CHARGES RE- PAID ...	—	58 12 10	1,349 12 4	POST OFFICE:		
134 3 0	TELEPHONE CHARGES REPAID	—	114 10 5	265 4 7	Postage ...	1,379 15 3	
117 4 0	INSPECTIONS ...	—	156 0 0	3,277 4 0	Telephones ...	137 14 10	
57 12 1	INSTRUMENTS:	—			Telegrams ...	4,945 10 0	6,463 0 1
608 11 4	Royal Navy ...	—		96 0 8	STATIONERY OFFICE:	—	146 0 10
30,064 3 7	By Sales from Stock ...	—	12,172 16 11	234 0 11	TRAVELLING EXPENSES	—	413 4 2
	SUPERANNUATION ACCOUNT:			25 0 0	SUPERANNUATION:		
540 0 0	Annuities... ..	519 7 6		132 2 0	Pensions not charge- able on Fund ...	3 9 10	
50 2 8	Interest on Invest- ments ...	50 2 8	569 10 2	532 10 0	Pensions chargeable on Fund... ..	194 13 6	
	*OBSERVATORIES, BRANCHES, AND STATIONS:			—	Annuities ...	504 7 6	
456 7 7	Richmond ...	580 9 8		1,776 9 4	Contribution to Fund	—	702 10 10
1,023 12 1	Eskdalemuir ...	1042 10 2		26,422 18 1	COST OF INSTRUMENTS:		22,627 0 6
27 11 5	Cahiriveen ...	39 17 0			Royal Navy ...	—	
27 2 11	Farnborough ...	120 5 8		2,540 3 8	For Stock ...	—	
—	British Rainfall Organization ...	5584 11 0		2,086 3 11	*OBSERVATORIES, BRANCHES, AND STATIONS:		
11 4 0	Falmouth... ..	—		1,068 2 1	Richmond ...	3,902 3 2	
—	Benson ...	—		776 2 8	Eskdalemuir ...	2,690 15 3	
—	Edinburgh ...	—		—	Cahiriveen ...	1,507 4 5	
476 4 9	Investigation of Atmospheric Pollution ...	474 5 0	8,007 7 1	—	Farnborough... ..	925 17 10	
192 19 6	Miscellaneous ...	165 8 7		—	British Rainfall Organization ...	1,129 5 5	
3 0 0	National War Bonds	—	1 5 7	617 1 9	Do. (Capital) ...	5,584 6 0	
4 13 8	Salaries refunded...	—		478 1 5	Do. (Stamp) ...	11 5 0	
49 0 4	BALANCE DUE TO BANK ...	—		547 13 6	Falmouth ...	586 5 0	
				—	Edinburgh ...	605 14 5	
				—	Aberdeen ...	530 11 4	
				1,720 9 7	Benson ...	1,302 18 11	
				1,221 12 1	Shoeburyness... ..	1,686 11 10	
				108 10 0	West Lavington ...	546 10 11	
					Investigation of At- mospheric Pollu- tion ...	841 13 9	
					Croydon ...	184 0 6	
					Lympne ...	2 17 0	
					Calshot ...	142 11 4	
					Didsbury ...	20 4 10	
					Biggin Hill ...	30 18 10	
					Cranwell ...	6 3	
					Miscellaneous ...	1,325 11 1	
					Balance due to Bank on April 1st, 1919 ...	—	23,557 13 1
					BALANCE:		49 0 4
					Cash at Bank... ..	2,629 11 8	
					„ at Office† ...	23 15 5	2,653 7 1
66,371 6 0			£89,283 13 7	£66,371 6 0			£89,283 13 7

* For details see pages 16-17.

Statement of Assets and Liabilities at 31st March, 1920.

LIABILITIES.				ASSETS.			
£ s. d.		£ s. d.		£ s. d.		£ s. d.	
10,894 0 3	To Sundry creditors	1,796 16 1	108 10 0	By Cash at Bank & Office (Bank)	2,629 11 8		
1,476 8 6	„ Superannuation	2,476 8 6		(Office)	23 15 5		
49 0 4	„ Balance due to Bank	—				2,653 7 1	
2,463 9 10	„ Balance...	23,083 4 0	36 8 2	„ Salaries reserved (premiums)		36 8 2	
			10,534 2 11	„ M.O. Instruments in Stock		21,932 8 2	
			3,191 17 2	„ Sundry debtors ...		2,046 4 2	
			1,012 0 8	„ Admiralty ...		688 1 0	
14,882 18 11		£27,356 8	£14,882 18 11				

NOTE.—On 31st March, the amount of Government securities held for the provision of Superannuation Annuities was £26 14s. 2d. 2½ per cent. Consols and £989 9s. 6d. 5 per cent. War Loan.

Statement of Receipts and Expenditure (to nearest £) during the twelve months

Service.	Richmond.		Eskdale.		Cahirci- veen.		Farn- borough.		Brit. Rain Org.		Fal- mouth.		Benson.		Edin- burgh.	
	1918 -19	1919 -20	1918 -19	1919 -20	1918 -19	1919 -20	1918 -19	1919 -20	1918 -19	1919 -20 *	1918 -19	1919 -20	1918 -19	1919 -20	1918 -19	1919 -20
Payments.	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Subventions ...	—	—	—	—	—	—	—	—	55	5,884	30	30	—	—	463	49
Cost of Forms ...	81	—	57	—	2	—	—	—	—	—	—	—	—	—	—	—
Salaries Scheduled ...	2,132	3,446	1,503	1,918	910	1,319	646	827	—	756	463	396	483	1,052	—	—
„ Overtime ...	34	52	—	—	—	2	—	10	—	8	—	11	—	—	—	—
Rent, Rates, etc. ...	48	88	25	56	56	67	—	—	—	4	48	50	—	130	—	—
Fuel and Lighting ...	102	155	267	326	31	31	—	—	—	1	—	—	1	4	—	—
Equipment and Insts. ...	11	40	14	25	8	11	45	26	—	2	—	1	4	59	—	—
Consumable Stores ...	61	45	23	34	9	10	1	—	—	1	1	1	39	26	—	—
Incidental Expenses ...	22	32	16	21	18	21	21	4	—	22	1	2	2	13	—	—
Books, etc. ...	7	6	19	15	13	12	4	3	—	1	1	—	1	—	—	—
Post Office Charges ...	37	37	41	50	21	22	53	53	—	28	71	81	17	18	—	—
Travelling, etc. ...	5	1	121	245	—	13	6	3	—	17	2	14	1	1	15	1
TOTALS ...	£ 2,540	3,902	2,086	2,690	1,068	1,508	776	926	55	6,724	617	586	548	1,303	478	60
Receipts.																
Subventions ...	—	—	—	—	—	—	—	—	—	5,584	—	—	—	—	—	—
Gassiot Trust ...	339	567	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parliamentary Grant ...	—	—	1,000	1,000	—	—	—	—	—	—	—	—	—	—	—	—
Rosse Trust ...	—	—	—	—	5	18	—	—	—	—	—	—	—	—	—	—
Adv. Com. on Atm. Poll....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Expenses refunded locally	97	6	24	43	23	22	27	120	—	1	11	—	—	—	—	—
Tests and Commissons ...	7	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cost of Books and Forms...	13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTALS ...	£ 456	580	1,024	1,043	28	40	27	120	—	5,585	11	—	—	—	—	—

* NOTE : British Rainfall Organisation ; Some iter

METEOROLOGICAL FIELD SERVICE, &c.

Statement of Receipts and Expenditure (to nearest £) during the twelve months ended 31st March, 1920, with the corresponding amounts for the same period of the previous year.

Service.	France.		Dardanelles.		Met. Section. R.E. (Home)		North Russian Expeditionary Force.		Totals.	
	1918-19	1919-20	1918-19	1919-20	1918-19	1919-20	1918-19	1919-20	1918-19	1919-20
EXPENDITURE.	£	£	£	£	£	£	£	£	£	£
Salaries :										
Lieut-Col. E. Gold ...	36	—	—	—	—	—	—	—	36	—
Maj. A. H. R. Goldie ...	—	—	—	—	—	—	—	—	—	—
Sergt. R. Pyser ...	28	7	—	—	—	—	—	—	28	7
„ E. L. Clinch ...	21	38	—	—	—	—	—	—	21	38
„ C. V. Ockenden ...	—	—	17	—	—	34	—	—	17	34
„ R. M. Poulter ...	10	—	—	—	—	—	30	—	10	30
Corpl. A. G. Goad ...	66	12	—	—	—	—	—	—	66	12
„ C. F. J. Jestico ...	21	36	—	—	—	—	—	—	21	36
Pte. W. J. Fowler ...	—	—	—	—	12	—	—	8	12	8
	182	—	—	—	—	—	—	less	23	—
REFUND ...	23	—	—	—	—	—	—	—	—	—
TOTAL FOR SALARIES	159	93	17	—	12	34	—	38	188	165
Incidental Expenses :										
Postage ...	18	3	5	—	—	1	—	—	23	4
Telegrams...	—	—	1,063	—	—	—	—	—	1,063	—
Printed Books ...	—	5	—	—	—	—	—	—	—	5
Miscellaneous ...	—	—	—	—	—	—	—	—	—	—
Instruments ...	4,247	464	579	—	1,106	275	—	228	5,932	967
TOTALS...	£ 4,424	565	1,664	—	1,118	310	—	266	7,206	1,141
RECEIPTS.										
War Office ...	5,015	470	623	—	1,027	267	—	228	6,665	965
	£ 5,015	470	623	—	1,027	267	—	228	6,665	965

ONE HUNDRED AND THIRD MEETING.

Air Ministry, Kingsway, W.C.2, 23rd June, 1920.

PRESENT :

THE PRESIDENT IN THE CHAIR.

THE DIRECTOR OF THE METEOROLOGICAL OFFICE.

CAPTAIN HARVEY.
THE HYDROGRAPHER.
COLONEL LYONS.MR. MEADOWCROFT.
SIR THOMAS MIDDLETON.
SIR ARTHUR SCHUSTER.

DR. WEDDERBURN.

MR. BERTRAM was in attendance.

Letters of apology for absence from Colonel Lewis and Mr. McNally were received.

The congratulations of the Committee were offered to the President on the occasion of his recent marriage and to Colonel Lyons on his appointment as Director and Secretary of the Science Museum.

843. Retirement of the Director (Minutes 798 and 826).—The following resolution was submitted by the President :—

THE Meteorological Committee have considered the reply of the Treasury, dated 29th March, to the application of the Director of the Meteorological Office in regard to a grant of a retiring allowance.

The Committee observe that while the Treasury do not feel justified in acceding to the Director's request, yet it has been decided to ask Parliament to vote a special grant of £2,000 (Two thousand pounds) in view of the exceptional services rendered by Sir Napier Shaw.

The Committee, whilst realising that the emoluments granted to Sir Napier Shaw as Director of the Meteorological Office were fixed at a higher figure than otherwise would have been adopted because of the understanding that such emoluments would not carry a title to a retiring allowance, feel that, as the Treasury are prepared to ask for a special vote, the sum proposed is an inadequate recompense for the quite exceptional services which Sir Napier Shaw has rendered in the interests of the British Meteorological Service.

The inadequacy of this sum is the more emphasised when it is realised that it represents an annuity of only £225 per annum. In this connection the Committee desire to point out that when Sir Napier Shaw (then Mr. W. N. Shaw) was appointed Secretary in the place of Mr. R. H. Scott, the Minutes of the Meteorological Committee of 4th February, 1900, record that Mr. Scott was retired on an annual pension of £400.

On retiring from the Directorship of the Meteorological Office, Sir Napier Shaw holds a position in Meteorology which is probably unique, for not only has he been Director for 15 years, but since 1907 has been the official Chief of the General International Meteorological Organisation. Under his guidance the British Meteorological Service has reached a position of pre-eminence. During the war he was the official adviser to the Government on Meteorology, and his advice was of the greatest value. On the decision of the Cabinet to co-ordinate all the Meteorological Services into one office under the Air Ministry, Sir Napier Shaw was able, by his intimate knowledge and long experience, to facilitate the task of reorganisation and co-ordination.

In their letter of the 29th March the Treasury state that Parliamentary sanction must be obtained for a special grant.

The Committee therefore resolve that the Air Council should be moved to approach the Treasury whereby Parliament should be asked to vote a more adequate sum than that proposed; a sum more worthy of the great services performed by Sir Napier Shaw, and more in keeping with the pre-eminent position he holds, not only in British Meteorology, but in International Science.

The resolution was proposed by Sir Arthur Schuster, seconded by Captain Harvey, and the Hydrographer, and unanimously approved.

The Minutes 836-842 of the Meeting of 28th April previously circulated in proof, were corrected and ordered for revise.

Arising from the Minutes the following questions were discussed :—

Functions of the New Meteorological Committee (Minute 838).—*Letter from the Royal Society.*—A letter from the Royal Society was read (File 209854/20), stating that the Council approved the recommendations forwarded by the Air Council (as set out in

Minute 838) and suggested that, in order to preserve the balance between the administrative and the scientific sides of the Committee, the vice-chairman should be elected from among the representatives of the scientific societies, viz., the Royal Society of London, and the Royal Society of Edinburgh.

The Committee agreed to adopt the recommendation.

Appointment of Staff by the Director.—With reference to paragraph 8 (ii) of Minute 838 which deals with the responsibility of the Director for the appointment of the staff of the Office, the question of the position of the establishment divisions of the Ministry (S.1 and S.2) was discussed.

It was agreed that the divisions were in the position of expert advisers, and that they had no discretion to veto a candidate selected by the Director unless his appointment were contrary to general regulation.

Committee of the Meteorological Office, Edinburgh (Minute 838).—Dr. Wedderburn's suggestion that the Scottish Universities should be represented on the Edinburgh Committee was considered.

It was agreed that there should be two representatives of the Scottish Universities on the Committee, each University in the order of seniority nominating a representative who would hold office for two years.

It was further agreed that in order to preserve continuity on the Committee one of the two members should retire each year, though the same member should be eligible as representative of different Universities in successive years.

844. CORRESPONDENCE.—**General Post Office.**—*Inter-Departmental Committee on the International Telegraph and Radio-Telegraph Conventions.*—Reported—the receipt of the following letter :—

No. 23961/20.—M.O. 30481.

General Post Office,
London, E.C.1,
16th June, 1920.

SIR,

Inter-Departmental Committee on the International Telegraph and Radio-Telegraph Conventions.

IN connection with the above Committee, I have the honour to inform you that the Government, with the concurrence of the principal Allies, has undertaken the preparation of an International Code for use in Visual Signalling and Wireless Telegraphy, capable of being translated into several languages; and that the work is being carried out under the supervision of Mr. E. W. H. Travis, of the Government Code and Cypher School.

It is suggested that the Meteorological Office should be represented on the Sub-Committee dealing with the Meteorological section of the Code, and if you concur, perhaps you will communicate the name of your representative to Mr. Travis, Government Code and Cypher School, Watergate House, Adelphi, W.C.2.

I am, &c.,

F. J. BROWN

(Chairman of the Committee).

Director,
Meteorological Office.

It was agreed to appoint Colonel Gold to serve on the Sub-Committee as the representative of the Meteorological Office.

Italian Meteorological Society (Minute 827).—Reported—the receipt of a letter (M.O. 30480) from the Italian Meteorological Society forwarded from 10, Downing Street, through the Hydrographer, stating that an International Meteorological Congress would be held at Venice at the beginning of October, and asking that a meteorological expert might attend as representative of the British Government.

It was agreed that no action could be taken.

Ministry of Agriculture and Fisheries.—*Observations of Salinity and Temperature in Northern Seas* (Minute 759).—Read—the following letter (M.O. 30482) :—

Ref. F.S. 838/1920.—M.O. 30482.

Ministry of Agriculture and Fisheries,
43, Parliament Street, S.W.1.

SIR,

I AM directed by the Deputy Minister of Fisheries to refer to the decision arrived at in 1913 at a Conference of representatives of the Meteorological Office and of the Fisheries Departments of England and Wales, Scotland and Ireland, to the effect that all surface records of salinity and temperature made in connection with Hydrographical Investigations of the three Fisheries Departments named should be transmitted to the Meteorological Office for inclusion in the Charts which formed part of the usual office routine of the Marine Section of that Department.

It will no doubt be remembered that at a later date the Governments of Denmark and Holland accepted an invitation to transmit the corresponding material collected in those countries, to be utilised in a similar manner, and that this procedure was in actual operation at the time of the outbreak of war in 1914.

In this connection I am to draw your attention to a Resolution passed at the recent meeting of the International Council for the Exploration of the Sea, in London, the terms of which were as follows :—

“It is recommended that surface observations of salinity and temperature be taken over the whole area of the North Atlantic Ocean, at least as far as 10°S., and that these observations be extended in greater detail into the tributary waters to enable surface charts of mean conditions to be drawn up. It is further recommended that this task be entrusted to the Meteorological Office, London, as arranged in 1912-13.”

The Deputy Minister is well aware of the difficulties of reconstruction which have to be surmounted, and of the fact that the programme in question may take some considerable time to bring into full working order; but, having regard to the scope of the material necessarily collected by Great Britain, he considers it most desirable to incorporate therewith such foreign material as can be obtained at little or no expense to this country.

I am accordingly to enquire whether it is now possible for your Department to re-establish the programme of charting the surface salinity and temperature conditions of the Northern Seas, as instituted before the War; and, if so, whether arrangements could be made to incorporate the further data collected as part of the general hydrographical programme of the International Council for the Exploration of the Sea, by observers in the various countries whose governments have signified their adhesion to the Council.

I am, &c.,
S. NATHAN.

The Director,
Meteorological Office.

The Director reported that the acceptance of the recommendation would probably involve little additional expenditure during the current year, and that it was mainly a question of staff.

General approval was given to the recommendation set out in the letter, and it was agreed that the details should be brought before the Sub-Committee on Marine Meteorology.

845. ANNUAL REPORT 1919-20 (Minute 837).—Proof copies of pp. 1-48 of the Annual Report for 1919-20, previously circulated, were laid on the table, and it was reported that copies of the remaining sections would be circulated at an early date.

It was agreed that the Report for 1919-20 should be addressed to the Treasury, and that in subsequent years it should take the form of a report to the Air Council. Authority was given to circulate proof copies to those concerned.

846. PROGRAMME.—**Kite Balloons** (Minute 791).—Submitted—the following memorandum by Capt. D. Brunt :

KITE BALLOONS—METEOROLOGICAL PROGRAMME.

1. *Selection of Stations.*—The programme indicated the advisability of using kite balloons for observational purposes at a number of stations. A total of at least nine stations was regarded as desirable and the following six stations were provisionally selected as a beginning :—

Shoeburyness,
Larkhill
Howden,
Scilly,
Valencia,
Shetland.

The selected stations must be off the general lines of air-routes and away from aerodromes.

Shoeburyness will be completely fitted up during the present year, and after some experience has been gained there, it will be advisable to put the remainder of the programme into execution as soon as practicable, beginning with Larkhill and Howden.

2. *Type of Balloons.*—The points to be borne in mind in the selection of type of balloon are :—

- (1) Ease of manipulation by a small number of men, mechanical devices being used when possible.
- (2) Durability under stress of weather.
- (3) Long duration of flight.
- (4) Safety in thunderstorms.
- (5) Available lift for instruments to be about 30 lbs.

Hitherto, the W type balloon of 5,000 cubic feet capacity, capable of attaining 5,000 feet, has been employed in meteorological work. This balloon can be manipulated by six or eight men.

A discussion of possible balloons resulted in the conclusion that a balloon capable of attaining a height of 15,000 feet would require such numbers of personnel that for the time being it must be

regarded as impracticable. The Director of Research undertook to design a new balloon capable of attaining 10,000 feet, and capable of manipulation by twelve men, or by six men with mechanical aid. It was decided that one such balloon should be constructed and flown at Shoeburyness. This balloon will cost £650. It will have an available lift of 35 lbs. for instruments. Its life will be about six months, so that two replacements per annum will be necessary. If a travelling monkey on rails is used to aid in manipulation, this balloon can be worked by six men, of whom one should be a trained rigger, and two should be trained winch-drivers.

3. *Cost of fitting a station for new type balloon.*—The present cost of fitting a station would be approximately as follows :—

<i>Capital Expenditure :—</i>							£
Shed, cover and erection	...	...	...	...	...	...	1,550
Alteration of winch to take new cable	...	...	...	...	...	...	150
Travelling monkey, with 230 yards of rail	...	...	...	...	...	...	430
Instruments	...	...	...	...	...	...	150
							<u>£2,280</u>

This total is exclusive of possible cost of purchase or lease of land for erection of shed.

<i>Annual Expenditure :—</i>							£
Two balloons at £650 each	...	...	...	...	...	...	1,300
Hydrogen and incidental expenses	...	...	...	...	...	...	250
							<u>£1,550</u>

To set up a new station and fit it with a balloon and supplies of hydrogen would therefore involve an immediate outlay of about £3,000.

<i>4. Cost of running station with W type balloon :—</i>							£
Shed	...	...	...	...	...	...	800
Balloon and winch	...	...	...	...	...	...	800
Annual charge for dilapidation and running costs	...	...	...	...	...	...	1,000
Instruments	...	...	...	...	...	...	100

A number of balloons and winches are available for issue from surplus stocks, so that during the immediate future the only charges to be met in connection with W type balloon stations would be the purchase and erection of shed, and cost of hydrogen and instruments. Capital outlay would be about £1,000, and annual expenditure, say £200.

5. *Cost of completing the Station at Shoeburyness.*—This station has been provided with a balloon shed, the cost of erection being met out of Army funds. A cover for this shed is now on order. The cost, £600, will be met by an item of £600 provided in the Estimates Vote 8 G, Shoeburyness. A new type balloon is in course of construction (*see* file 152540/20) and will be delivered in the course of the present financial year. An item of £1,500 in Estimates Vote 8 G, Shoeburyness, can be applied to meet the remaining expenses, which will be approximately as follows :—

							£
New type balloon	...	...	...	...	...	...	650
Alteration to winch	...	...	...	...	...	...	150
Travelling monkey and rails	...	...	...	...	...	...	430
							<u>£1,230</u>

The balance of £270 will more than suffice to meet the incidental costs of running (hydrogen, etc.).

6. The following points should be noted :—

- (1) Eight petrol winches, suitable for use with the new balloons (after modification), are being retained by D. of E. (E 3) for the use of the Meteorological Services (*see* File D. 46637).
- (2) Sheds (without covers) would probably be available from excess stores.
- (3) A complete shed for housing a balloon would possibly be available at Howden.

7. The work at Shoeburyness during the current year will be of the nature of an experiment, and the design of future balloons, instruments to be used, as well as estimate of cost of running, etc. should be revised later in the light of experience gained at Shoeburyness.

The Director reported that members of the Sub-Committee on Meteorology and Navigation of the Research Committee were likely to press for the immediate establishment of an adequate number of kite-balloon stations. It was also pointed out that such stations could only be set up at places where there was already a crew available. Dr. Wedderburn suggested that observations from free balloons would probably be of more value than observations from small kite balloons.

It was agreed that the memorandum should be circulated to the members of the Meteorology Sub-Committee of the Research Committee.

Sub-Committee on Marine Meteorology (Minute 842).—Reported—that two meetings of the Sub-Committee had been held on 13th May and 17th June. The Minutes of the first meeting previously circulated were approved.

The following memorandum (File 29750) on the duties of Port Meteorological Officers was submitted :—

It is proposed to appoint Port Meteorological Officers to act as agents for the Office, and to foster an interest in meteorology among marine observers. It is understood that observations from the sea form an essential part of the material for the meteorology and climatology of the Globe, and for the construction of adequate daily synoptic charts for the immediate purposes of forecasting. The chief object of the appointment of a port meteorological officer is to promote the co-ordination of observations on land and sea.

The immediate duties of a Port Meteorological Officer are :—

1. To carry out the instructions of the Central Office with regard to the supply of instruments to observers on ships which keep a four hourly log or transmit daily observations by wireless to the Office. With this object sets of instruments will be kept at the agency for issue to ships as required.
2. To maintain a supply of forms for observing to ships sailing from his port, which have undertaken to observe for the Office, and to collect logs and registers from ships on their arrival in port and dispatch them to the Office or deal with them otherwise as instructed.
3. To inspect and compare with standards from time to time the instruments belonging to ships sailing from or calling at his port from which observations are supplied to the Office.
4. To carry out approved arrangements for the supply of the publications of the Office to observers and to the general public. To hold a store of selected publications for issue upon repayment, or for presentation to observers and others, in accordance with regulations.
5. To keep a file of Office publications and other documents accessible for consultation by observers and others.
6. To enlist the co-operation of officers of the Mercantile Marine as observers, especially with a view to observations from parts of the Oceans, from which few data are available at the Office, or for which information is from time to time specially desired.
7. To make suitable arrangements for the public display of the Daily Weather Report and other current meteorological information, in consultation with local harbour or other authorities or otherwise.
8. To supply information on meteorological matters in reply to inquiries from observers and others, and to advise as to the supply of information in reply to inquiries which cannot be dealt with by the Officer himself.
9. Such other duties as the Director may assign from time to time.

In order to keep in close touch with observers Port Meteorological Officers should board all ships keeping full meteorological logs for the Office upon their arrival, or as soon after as possible. Ships contributing W/T reports should also be boarded at frequent intervals; other ships reporting to the Office should be boarded as occasion offers.

Port Meteorological Officers should also endeavour to maintain close relations with Nautical Training Institutions at their own or neighbouring ports.

Port Meteorological Officers are graded as Senior Professional Assistants. The salary is £250, with normal War Bonus at Civil Service Rates in addition, rising by annual increments of £15 to £350. The appointment is subject to the production of a Certificate of Birth and British nationality and a certificate of good health from a qualified practitioner. The appointment is on probation for a period of six months and subsequently is terminable by three months' notice on either side. The appointments are pensionable on the University scheme of superannuation.

Before taking up duty at a special port an officer will attend at Headquarters for a period of at least three months for training and for acquiring familiarity with the scope of the Meteorological work of the various divisions of the Office and with their routine.

It was reported that the Sub-Committee had considered the memorandum at their meeting on 17th June, and recommended that it was desirable to proceed with the appointment of the Port Meteorological Officers for Glasgow and Liverpool for which provision was made in the estimates for 1920–21, and suggested that the first two appointments should be made from officers of the Mercantile Marine, who would attend at Headquarters for a period of training.

Approved.

Sub-Committee on Rainfall (Minute 842).—Reported—that the first meeting of the Sub-Committee had been held on the morning of the 23rd June, and that the minutes would be circulated to the Committee.

The Sub-Committee had had under consideration the publication of "*British Rainfall*" for 1919 and recommended :—

- (1) that the form and type of "*British Rainfall*" should be adhered to.
- (2) that to ensure this object the price of the volume should, if necessary, be increased.

It was also reported that a map showing the distribution of rainfall on the occasion of the Louth Flood had been submitted to the Sub-Committee, and also that a rainfall map of the Lake District on the scale of half an inch to a mile had been prepared which it was recommended should be published as a specimen, with a view to the preparation and publication of similar maps for the whole of the British Isles.

Approved.

Advisory Committee on Atmospheric Pollution (Minute 833).—Submitted—the following report (File 26201) which had been forwarded to the Department of Scientific and Industrial Research :

METEOROLOGICAL OFFICE, LONDON.

ADVISORY COMMITTEE ON ATMOSPHERIC POLLUTION.

47, Victoria Street,
Westminster, S.W.1.
May 1920.

REPORT TO THE METEOROLOGICAL COMMITTEE OF PROCEEDINGS IN THE YEAR 1919.

The Advisory Committee at the close of the year consisted of the following members :—

Sir Napier Shaw, F.R.S., Director of the Meteorological Office (<i>ex-officio</i>)			Appointed by the Meteorological Committee.
(Chairman).			
Professor H. B. Baker, C.B.E., F.R.S. (Royal College of Science).			
Mr. J. G. Clark, F.I.C.			
Professor J. B. Cohen, B.Sc., Ph.D., F.R.S. (Professor of Organic Chemistry, Leeds University).			
Dr. H. A. des Vœux (Hon. Treasurer, Coal Smoke Abatement Society).			
Dr. J. S. Owens (Coal Smoke Abatement Society).			
Dr. E. J. Russell (Director of the Rothamsted Experimental Station, Harpenden).			
Bailie W. Smith (Member of Departmental Committee on Smoke Abatement).			
Mr. S. A. Vasey, F.I.C., F.C.S. (Director of the "Lancet" Laboratory).			
Mr. F. J. W. Whipple (Superintendent of the Statistical Division, Meteorological Office).			
Dr. John Robertson,	by the Corporation of Birmingham.		Nominated by the Municipal Authorities contributing observations.
Dr. W. Hanna,	" "	Liverpool.	
Dr. W. T. Howarth	" "	the City of London.	
Mr. Henry Mills, J.P.	" "	London County Council.	
Mr. W. Osborne Thorp,	" "	Corporation of Malvern.	
Prof. W. Haldane Gee,	" "	Manchester.	
Mr. C. T. Stapleforth, J. P.,	" "	Newcastle-on-Tyne.	
Dr. J. B. Wilkinson, J.P.,	" "	Oldham.	
Dr. J. R. Ashworth,	" "	Rochdale.	
Dr. Cates,	" "	St. Helens.	
Mr. John Fyfe,	" "	Stirling.	
Mr. W. S. Curphey. (Chief Alkali Inspector of the Local Government Board). Appointed by the Advisory Council for Scientific and Industrial Research.			

Five meetings of the Committee have been held on the following dates :—June 27th, 1919, July 16th, 1919, October 13th, 1919, January 16th, 1920, April 12th, 1920.

The Chemical Sub-Committee, which was appointed to advise upon the chemical aspects of the study of atmospheric pollution, has been continued. A note of its proceedings appears at the end of this report.

Mr. G. M. Watson, B.Sc., who was appointed research chemist for the investigation at the suggestion of the Sub-Committee, was obliged, owing to illness, to resign his post temporarily in December last. The work has been carried on since that time by Mr. A. N. Maud (January 30th to April 7th), and later by Mr. Bolton.

The results for 1918-19 have been compiled in a report which was presented to the Department of Scientific and Industrial Research. The Report on Acidity Research is embodied therewith. The Report has, with the permission of the Department, since been published by the "Lancet" as a supplement to that Journal. 28 gauges have been in operation during the year 1919-20 maintained by 12 municipalities and one gauge by the Meteorological Office. The report for 1919-20 is in course of preparation.

Efforts have been made during the year to bring the importance of the work to the notice of large towns and health resorts with a view to obtaining additional observations; as a result stations temporarily suspended during the war have been reopened at Hull, Stirling, Birmingham and Wishaw, and there is a possibility of further stations being established. An observer at Banff has been making experiments on the results to be obtained from analysis of the water collected in a 5" rain gauge; and it is hoped that a standard gauge will be set up at the station.

After examination of specimen records of the original automatic filters designed by Dr. Owens, an order for six instruments has been placed with Messrs. Casella, at an estimated cost of £33 each, and the order is nearly completed. The instrument was exhibited at the last meeting of the British Association, at the British Science and Key Industries Exhibition at Glasgow, and also at the Royal Institution.

Experiments with a cylindrical screen have been made at Rochdale by Dr. Ashworth, and also at the Meteorological Office in order to get some indication of the direction from which impurities come, but satisfactory results have not yet been obtained. Dr. Ashworth is also experimenting with a special gauge designed to indicate the direction from which impurities come.

An inspection of gauges in the London area was made by Dr. Owens in December and the remainder of the gauges will be inspected immediately on Dr. Owens' return from abroad.

Chemical Sub-Committee.—The Sub-Committee appointed to consider points arising in connection with the chemistry and physics of the atmosphere has been continued, and at the end of the year consisted of the following members :—

Mr. J. G. Clark, F.I.C.

Dr. E. J. Russell (Director of Rothamsted Experimental Station).

Mr. S. A. Vasey, F.I.C., F.C.S. (Director of the "Lancet" Laboratory).

Mr. F. J. W. Whipple (Superintendent of the Statistical Division, Meteorological Office).

Mr. W. S. Curphey.

Professor H. B. Baker, F.R.S. (Royal College of Science).

Professor W. Haldane Gee, Manchester.

Mr. J. H. Coste.

Five meetings of the Chemical Sub-Committee have been held. The Committee has been concerned mainly with the following matters :—

1. Experiments on the determination of the acidity in the air. Methods of separating the gaseous and suspended acidity have been evolved and a new instrument for obtaining quantitative measurements of the amount of gaseous acidity has been designed.
2. The improvement of the standard gauges for collecting the deposit. Tests have been made of specimens of acid-proof enamel, and of duroprene for the prevention of "weathering." Improvements have also been made in the connection between the gauge-vessels and the bottles, and a new copper connection has been tested and issued to the co-operating authorities.
3. The discussion of the possibility of the use of small rain gauges for measuring the deposit, with a view to utilising the existing rainfall organisation for the collection of pollution data. Experiments have been made with 5 inch and 8 inch gauges, and consideration has been given to the question as to which elements gave sufficient deposit to be measured, in these smaller gauges. The discrepancies in the results at first obtained have been investigated and were found to be due to the dissolved metal.
4. The investigation of the causes of the discrepancies in the readings of certain of the London gauges.

NAPIER SHAW,
Chairman of Advisory Committee.

Approved.

847. COLONIAL STATIONS.—*St. Kilda.*—*Proposed meteorological and wireless station* (Minute 818).—Reported—with reference to the establishment of a meteorological station at St. Kilda which had been under consideration, that neither the Admiralty nor General Post Office had seen their way to bear any part of the cost (File A 17460). The Controller of Communications had suggested Stornoway as an alternative station, should the establishment of a station at St. Kilda prove impracticable, but it was pointed that Stornoway could not be regarded as an alternative to St. Kilda from a meteorological point of view.

It was agreed that the matter should be reconsidered at a later date.

Malta (Minute 839).—The Director reported that he was not yet prepared with a recommendation for a Superintendent to take charge of the Meteorological Service of the Mediterranean at Malta, and suggested that some additional allowance should be given, as it was very desirable to fill the post with an officer with substantial meteorological experience.

The President suggested that the most suitable method would be to maintain the basic salary at the same figure as for superintendents in the British Isles, and to add a special allowance for duty in Malta.

Approved.

Tanganyika Territory.—*Amani Meteorological Institute.*—The Director reported that a letter (M.O. 52755) had been received from Mr. Allyn Leechman, who had taken over the duties of Director of the Biological Agricultural Institute at Amani (ex German East Africa), asking for advice and assistance in carrying on the meteorological work of the Institute.

It was agreed to send a letter to the Colonial Office urging that adequate provision should be made by carrying on the meteorological work formerly done by Germany in this and other territories which have now come under British control.

848. OFFICE STAFF.—**Director's Orders for Confirmation.**—Reported—the following :—

Resignations : The resignation of **J. Logie**, Senior Professional Assistant in the Forecast Service (Minute 821) is accepted with effect on 1st August, 1920. (Order 1104.)

The resignation of **S. R. Rozier**, Boy Clerk in the Forecast Service (Minute 715), is accepted with effect on 30th May, 1920. (Order 1113)

Increase of Wages : 1096 increasing the wages of **O. J. Lampard** (Minute 840) resident caretaker at Kew Observatory to 31s. per week, as from 19th April, 1920, in accordance with the terms of Order 1081.

Promotions : 1112 promoting **F. W. Creek** (Minute 742), Assistant Packer in the Instruments Division to Store Keeper, on transfer to Administration Division, Headquarters, with effect on 1st June, 1920.

1116 promoting **Miss T. M. Hunt** (Minute 685), temporary clerk in the Library section, to Clerk Computer with effect on 1st June, 1920.

1122, promoting **R. M. Poulter** (Minute 754) Clerk Assistant in the Forecast Service, Headquarters, to Staff Assistant, as from 14th June, 1920, at a salary of £175 per annum, with normal War Bonus.

New Appointments : 1098, reappointing **A. H. French** (Minute 732) Boy Assistant in the Marine Division, on return from absence following his accident in January, 1920, with effect on 3rd May, 1920.

1103 appointing **Albert Walters** (Minute 801), Senior Professional Assistant in the Forecast Service on the conditions set out in letter 16695, for duty at Felixstowe Seaplane Station. The appointment to date from his demobilization on 28th April, 1920.*

1117, appointing **R. T. Andrews**, Technical Assistant in the Forecast Service, with a salary of £75, plus normal War Bonus. The appointment to date from 7th June, and to be on probation for three months, and subsequently subject to three months' notice on either side.

1118, appointing **William Glyn Williams**, Technical Assistant in the Marine Division, at a salary of £75, plus normal War Bonus. The appointment to date from 8th June, and to be on probation for three months, and subsequently subject to three months' notice on either side.

Approved.

Sub-Committee on Conditions of Service of Clerical and Technical Staff (Minute 838).—It was reported that the Sub-Committee had already held several meetings, but had not yet submitted a report. It was expected that the last meeting would take place on Friday, 25th June, 1920.

Clerk to Commissioners of Income Tax.—Reported—that certain members of the Office Staff had applied to the Commissioners of Income Tax for a deduction from the amount of assessable income in respect of instruments, books, &c., stated to be purchased for the execution of their official duties. The Director stated that he had been in communication with the Clerk to the Commissioners on the subject, and had suggested that the claim was justified on the same grounds as those upon which a deduction is made to professional men. The Inland Revenue Department had, however, found itself unable to admit of the deduction in view of the fact that the instruments, books, &c., required by the officials for the routine duties were provided by the Office (File 30581).

War Bonus (Minute 821).—Reported—the application to the members of the Office Staff of the war bonus award as set out in the Report of the Civil Service National Whitley Council Cost of Living Committee.

The scale of war bonus is as follows :—

- (a) Where the ordinary rate of remuneration does not exceed 35s. a week (£91 5s. per annum):—
130 per cent. of ordinary remuneration.
- (b) Where the ordinary rate of remuneration exceeds 35s. a week (£91 5s. per annum) but does not exceed £200 per annum :—
130 per cent. on the first 35s. a week (£91 5s. per annum);
60 per cent. on such amount of ordinary remuneration as is in excess of 35s. a week (£91 5s. per annum).
- (c) Where the ordinary rate of remuneration exceeds £200 per annum :—
130 per cent. on the first 35s. a week (£91 5s. per annum);
60 per cent. on the next £108 15s. per annum;
45 per cent. on such amount of ordinary remuneration as is in excess of £200 per annum, up to £500 per annum.
- (d) For the purposes of this scheme the expression "ordinary remuneration" shall be deemed to include remuneration by way of allowance, but to exclude overtime pay, war bonus and all other emoluments or their monetary equivalent. In the case of piece-workers their wages shall be based on the time rate for an ordinary working week and not on their piece-work earnings.
- (e) The bonus to be applied as from 1st March, 1920, irrespective of age or sex, to all permanent full-time officers and employees of the Government whether established or unestablished, and part-time employees engaged on manual duties to whom the terms of Civil Service Arbitration Board Awards No. 84 and No. 101 have been applied. In the case of part-time employees engaged on manual duties the bonus to be calculated at such proportion of the bonus payable to full-time employees on similar work as their ordinary hours of work bear to such full-time employment.

* Altered to 5th May, 1920. (Order 1131).

- (f) The bonus to be subject to revision every four months during the first twelve months (*i.e.*, on 1st July, 1920, 1st November, 1920, and 1st March, 1921) and thereafter every six months.
- (g) For the purpose of these revisions the standard cost of living figure to be arrived at by taking the average of the official figures (as defined in paragraph 3 (a) above) for the preceding four months (or for the preceding six months in the case of revisions subsequent to that of March, 1921), *e.g.*, the revision on 1st July, 1920, to be based on the average of the official cost of living figures at 1st March, 1st April, 1st May, and 1st June, respectively.

The bonus described in subsections (a) (b) and (c) to be increased or decreased by $\frac{1}{26}$ th (*i.e.* $\frac{5}{130}$) for every 5 full points by which the average cost of living figure, so determined, rises above or falls below 130, variations of less than 5 full points in either direction being ignored.

- (h) In the case of persons retiring on or after the 1st March, 1920, the pay and emoluments on which their pensions and/or gratuities would normally be granted shall be increased by 75 per cent. of the bonus current at the date of retirement except in cases falling within the scope of Section 12 of the Superannuation Act, 1834. In such cases the amount of bonus reckoning for pension, &c., shall be the average annual amount drawn in the three years preceding retirement or death, or three-quarters of the bonus actually drawn at retirement or death, whichever is less.
- (i) In the case of the lowest wages grades, for which Award No. 101 would be more favourable, persons in the Service on 1st March, 1920 to have the option of continuing to be paid in accordance with Award No. 101 so long as the average cost of living figure is not less than 125, provided that any person who elects to take the new bonus whilst the average cost of living figure is still not less than 125, shall not be entitled to exercise a fresh option with the view of reverting to the former scheme.
- (j) The increases accruing from this scheme to count as heretofore for the purpose of calculating overtime pay. Persons whose overtime pay is calculated at a fixed rate or is subject to an over-riding maximum to receive a corresponding benefit by way of increase in the fixed rate or over-riding maximum, the amount of such increase to be determined by agreement.

Payment of Professional Staff on New Scales.—With reference to the new scales of salary approved by the Committee on Salaries of Scientific and Technical Officers (Minute 829), it was reported that a letter was being sent to the Treasury by the establishment division suggesting that the members of the Office Staff should be allowed to count their previous service either in the Office or in the Meteorological Section R.E. and R.A.F. towards seniority in fixing their commencing salary on the new scales, and also inquiring whether the scales applied equally to men and women. The letter further asked that particulars might be given as to the application of the University scheme of superannuation.

Letter from Colonel Gold.—Reported—the receipt of a letter from Colonel Gold (Minute 780) asking that, in view of his nine years' service as Superintendent, on his appointment as Assistant-Director he should be granted one year's seniority, and that his second increment should date from 1st September, 1919, and also suggesting that the scale of salary for Assistant-Directors should be raised to £850-£1,000.

It was agreed that the question could only be settled by reference to the Treasury.

Superannuation of Mr. Sargeant.—Reported—that some difficulty arose as to the pension for which Mr. Sargeant was eligible in view of his promotion to Assistant-Superintendent (Minute 830) which transferred him from the clerical to the professional staff.

The Director recommended that he should be paid pension at the same rate as if he had retired on 31st March, 1920, *i.e.*, the maximum for the clerical staff, but that he should be eligible for the 5 per cent. deduction and the 10 per cent. addition under the University superannuation scheme for the current year.

General approval was given, but it was agreed that the matter would have to be taken up with the financial authorities.

849. OBSERVATORIES AND STATIONS.—**Glasgow.**—The telegraphic reporting station at Springburn Park, which was opened in May, 1913 (Minute 435), in co-operation with the Glasgow Corporation has been closed at the request of the Corporation.

Renfrew.—A meteorological station was established at Renfrew on 20th May, 1920, in charge of H. St. G. Dyke Marsh, Professional Assistant attached to the Forecast Service.

The station is not among those covered by the establishment authorised by the Treasury, but was necessary in order that meteorological observations should be available at the aerodrome; it was the more important owing to the closing of the station at Springburn Park, Glasgow.

It is feared that Mr. F. L. McCreary, appointed Technical Assistant on 4th March (Minute 830), and posted to Renfrew on 20th May, has lost his life in the ascent of Ben Lomond. He had leave to make the ascent on 9th June, and has not been seen since shortly after leaving Rowardennen Hotel for the climb.

Pulham.—A meteorological station was temporarily re-opened at Pulham on 31st May.

Baldonnell.—J. J. Somerville, officer in charge of the meteorological station at Baldonnell, was demobilised on 1st May, and from that date takes charge of the station as Professional Assistant on the Office Staff (Minute 821).

Great Yarmouth Coast Defence Station (Minute 804).—*Request for permission to retain anemometer clock.*—Reported—that the anemometer was being removed from the Sailors' Home at Yarmouth, and that on communicating the fact to the Manager, a letter M.O. 53,387, had been received asking that the clock might be retained by the Home as a memento.

It was agreed that the Committee was not in a position to make a presentation of the clock to the Home, but authority was given for the clock to be retained until such time as it was required for other purposes.

Larkhill Artillery School (Minute 831).—Submitted—the following syllabus of lectures to gunnery officers and sound-ranging officers drawn up by the Superintendent for Army Services.

LECTURE ON METEOROLOGY TO GUNNERY OFFICERS.

The meteorological factors directly affecting the path of a projectile are (a) density of air, (b) motion of air, or wind. Density controlled by pressure, temperature, and humidity.

1. *Pressure.*—How measured. Mercury barometer and aneroid. Reduction to M.S.L., and calculation of barometer reading at battery height from M.S.L. reading. Setting the aneroid. Normal pressure.

2. *Temperature and Humidity.*—Thermometers protected from direct sunshine. Variation of temperature with height. Differences between winter and summer, clear and cloudy weather. Diurnal variation at ground and at 1,000 feet.

Ground temperature no guide to mean temperature along the trajectory. Observations required up to maximum height of trajectory. If no observations above ground, estimate should be made by experienced meteorologist.

Amount of water vapour in the atmosphere variable. Effect on gunnery is small compared with that of variations of temperature and wind. Saturation. Relative humidity. Standard R.H. 50 per cent. assumed in Range Tables. R.H. measured by wet and dry bulb thermometer. Find temperature at which air half saturated has same density as air of observed temperature and humidity. Calculation of ballistic temperature from temperatures so corrected.

3. *Wind.*—(a) How measured. Anemometer. Free balloons watched with theodolite. Direction by cloud observations. Computed wind.

(b) Variation with height, no rule.

(c) Diurnal variation at ground and above 1,000 feet in winter and summer. Changes at sunset and sunrise.

(d) Equivalent constant wind, how computed and how applied.

LECTURES TO SOUND RANGING OFFICERS.

No. 1.

Chief meteorological elements for consideration are (a) wind, (b) temperature, (c) humidity. For all practical purposes the third need not be considered.

Wind.—Controlled by distribution of pressure—weather map of isobars, etc. Near surface, wind influenced by friction with the earth and by the diurnal changes of temperature; this may extend to considerable heights, gustiness, variations from minute to minute—*anemograms*.

Variation with height depends on time of day, the velocity increases upward to a height of about 2,000 ft., and usually after that height but not always, diagrams of variation with height, the increase is accompanied by a veer in direction.

Diurnal Variation: at surface wind usually increases and veers during the day, decreases and backs at night—reason: the reverse is true for wind at 1,000 ft.

Methods of measuring wind; anemometers—pilot balloons—sound-ranging method. Necessity for frequent measurement in lower layers.

No. 2.

Temperature.—Its measurement—thermometers, thermographs—difference between shade temperature and sun temperature—shade temperature usually taken in a specially constructed screen—shade of a tree usually quite good.

Diurnal Variation of temperature at the surface, at greater heights. Fall (or rise) of temperature with height or temperature gradient (or lapse rate of temperature) depends on time of day, nature of the day and season of the year—lapse rate on rainy days—fine summer days, average lapse rate.

Special conditions obtaining on clear nights.

Temperature to be used for correction purposes; shade temperature good enough by day especially if there is a moderate wind, on clear nights the surface temperature is too low, rough rule for temperatures on clear nights. Temp. to be used

$$= T + \frac{2}{3} (\text{noon temp.} - T).$$

Dependence of temperature on wind velocity.

Approved.

850. PUBLICATIONS.—Copies of the following publications issued since the last meeting were laid upon the table :—

M.O. 235*c*. **Daily Readings** at Meteorological Stations of the First and Second Orders, 1919.

M.O. 220*f*. **Geophysical Memoirs, No. 16.**—Aids to Forecasting: Types of Pressure Distribution, with Notes and Tables for 14 years, 1905-18, by E. Gold, F.R.S.

M.O. 232*h*. **Professional Notes, No. 8.**—Temperatures and Humidities in the Upper Air, by Captain C. K. M. Douglas.

Proofs of the following were laid on the table :—

M.O. 240*a*. **Professional Notes, No. 11.**—Notes on the Ground Visibility at Cranwell, Lincolnshire, by W. H. Pick, B.Sc.

M.O. 240*b*. **Professional Notes, No. 12.**—An Analysis of the Rate of Ascent of Pilot-Balloons at Butler's Cross, Salisbury Plain, by R. P. Batty, B.A.

M.O. 240*c*. **Professional Notes, No. 13.**—A Report on Two Pilot-Balloon Ascents made at Shoeburyness, by N. K. Johnson, B.Sc.

Authority was given for the following to be published as Professional Notes :—

Tables of Frequency of Surface Wind Directions and Cloud Amounts at Metz, Mülhausen, Karlsruhe, and Frankfurt, by D. Brunt, M.A.

Diurnal Variations in Wind Velocity and Direction at Different Heights, by Captain J. Durward.

851. DIRECTOR'S REPORT AND ACCOUNTS :—

Training of Officers for Meteorological Work in Middle East (Minutes 842). Reported—that the officers had completed their course of lectures at the Meteorological Office and at the Imperial College, and had proceeded to Kew Observatory on June 10th, for a course of training in pilot balloon work and the care and use of instruments. It was arranged that they should undergo a month's training in navigation at Calshot beginning on July 5th, after which they would report at the Meteorological Office Headquarters, for instruction in forecasting, and the work of a distributive station.

League of Red Cross Societies. Reported—that a letter 29,265, had been received from the Secretary of the League of Red Cross Societies asking that notice of the occurrence of serious atmospheric or seismic disturbances might be sent by telegraph to the League's Headquarters at Geneva; and that a reply expressing the willingness of the Office to assist the work of the League, if a practical scheme could be put forward, had been sent.

Excellent Logs.—On the recommendation of the Sub-Committee on Marine Meteorology (*see* Minutes of First Meeting approved by Minute 846) the special recognition of "excellent" logs is in future to be based upon the contributions of officers in the course of a year instead of the separate occasions of the several logs.

The following list of logs received since 12th April, which have been classed as excellent, was reported.

Log 15427 of S.S. Conway,	W. C. Hodge (Captain).
" 15428 of S.S. Port Macquarie,	W. G. Higgs "
" 15429 of S.S. Runic,	Capt. J. Roberts "
" 15433 of S.S. Batsford,	W. Henderson "
" 15435 of S.S. Krasnoiarsk,	W. Tingey "
" 15437 of S.S. Margha,	Comdr. R. A. Milne "
" 15438 of R.M.S. Orontes,	Comdr. I. J. Hayes "
" 15423 of C.S. Colonia,	V. Campos "
" 15424 of S.S. Port Caroline,	A. Hoad "

School of Meteorology in connection with the Imperial College of Science and Technology.—A proposal has been made that the Air Ministry should co-operate with the Imperial College of Science and Technology in the establishment of a School of Meteorology, associated with the School of Aeronautics recently established to give effect to the Zaharoff benefaction.

It is suggested that the school should be in charge of a Professor of Meteorology in the Imperial College, who would be appointed by the Imperial College with the concurrence of the Air Ministry.

The proposed course of instruction would include :—

- (a) The necessary study of Physics and Mathematics, which will be conducted in the Laboratories and class rooms of the Imperial College, and
- (b) The study of Meteorology, theoretical and practical, which will be conducted at the Meteorological Office, South Kensington, and at such other of the establishments of the Meteorological Office as might be approved from time to time.

Visit of Meteorologists to Bergen.—A letter (M.O. 29399) has been received from Professor V. Bjerknes, Director of the Geophysical Institute at Bergen, inviting a number of British Meteorologists to attend an informal meteorological conference at Bergen during the last fortnight of July.

The meeting has been arranged in order to give meteorologists an opportunity of studying the new method of forecasting by observations from a close network of stations which has been developed in Norway during the War.

It is proposed that the following should attend from the Meteorological Office: The Director, Major A. H. R. Goldie (Superintendent of Distributive Stations, England; Wales and Ireland), Mr. L. F. Richardson (Assistant-Superintendent for Upper Air Research), Captain C. K. M. Douglas (Professional Assistant in the Forecast Service), and that Colonel L. F. Blandy should attend as Controller of Communications.

Royal Agricultural Show at Darlington.—Arrangements are in progress for an exhibit from the Meteorological Office to be sent to the Royal Agricultural Show (Minute 769), which is to be held this year at Darlington, from June 29th to July 3rd. It is proposed, subject to Treasury sanction for increased subsistence allowance, that the exhibit should be in charge of two Professional Assistants, Mr. C. W. Lamb and Mr. N. H. Smith, from the Statistical and Instruments Divisions.

Aeronautical Research Committee: Sub-Committee on Meteorology, Air Navigation, and Atmospheric Electricity.—The first meeting of the Sub-Committee was held at the Meteorological Office, South Kensington, on Tuesday, 8th June. The following have been appointed members of the Sub-Committee:—

Sir Napier Shaw (Chairman).
 Wing Commander T. R. Cave-Brown-Cave.
 Lieut.-Col. E. Gold.
 Professor B. M. Jones.
 Professor H. Lamb.
 Mr. G. I. Taylor.
 Colonel L. F. Blandy (Controller of Communications).
 F/L R. S. Capon (I.D.E. Home).
 Major H. E. Wimperis (Air Ministry).
 A Representative of the Navigation Section of the Air Ministry.
 Dr. T. E. Stanton (N.P.L.).
 Mr. G. M. B. Dobson (R.A.E.).
 Mr. W. H. Dines.
 Professor F. A. Lindemann.
 Mr. C. T. R. Wilson.
 A Wireless Expert.

Crystal Palace: Imperial War Museum.—Arrangements have been made for an exhibit from the Meteorological Office in connection with the Imperial War Museum, which was opened on Wednesday, 9th June.

The exhibit includes specimens of the working charts of the Meteorological Section, R.E., copies of the various Daily Weather Reports issued to the Forces, photographs of the several R.A.F. Meteorological Stations and charts of the weather on the occasion of zeppelin raids; a number of meteorological instruments used during the war are also shown.

It is proposed to give demonstrations of pilot balloon observations twice weekly, on Wednesday and Saturday afternoons.

Accounts.—Submitted—the following statement:—

The amount received by the Meteorological Office from 1st April to 22nd June, 1920, was £1,146 8s. 11d.

The monies have been paid over week by week to Dept. F.E. of the Air Ministry.

The amount standing to the credit of the Meteorological Committee in the Bank of England is £2,660 9s. made up thus:—

		£	s.	d.	£	s.	d.
	Balance on 31st March	2,629	11	8			
April 6th	Dividend on Consols		3	4			
" 7th	Draft on Washington, lodged on 4th March but not credited till April 7th		5	19			
June 1st	Dividend on Stock	24	14	8			
		2,660	9	0			
	Balance of Petty Cash in hands of Cashier	23	15	5			
					2,684	4	5
	There is due by the M.O. on Superannuation Account:—						
	March 31st	2,476	8	6			
	April 6th, Dividends		3	4			
	June 1st, "	24	14	8			
		2,501	6	6			
	Balance on Schuster Readership Fund	43	15	0			
					2,545	1	6

The Director reported that £43 15s. was still in hand on account of the Schuster Readership, and asked Sir Arthur Schuster for instruction as to its disposal. Sir Arthur Schuster replied that it might be used in any manner that the Director might deem fit.

ONE HUNDRED AND FOURTH MEETING.

*Air Ministry, Kingsway, W.C.2,
28th July, 1920.*

PRESENT :

THE CONTROLLER-GENERAL IN THE CHAIR.

MR. FLOOD.

MR. McANALLY.

LT.-COL. LEWIS.

MR. MEADOWCROFT.

COLONEL LYONS.

DR. WEDDERBURN.

The Director was unable to be present owing to absence in Norway; Colonel Gold attended as his representative.

Mr. Bertram was also in attendance.

Letters of apology for absence from the Hydrographer and Sir Thomas Middleton were received.

852. The Minutes 836-842 of the Meeting of 28th April, previously circulated in revise, and the Minutes 843-851 of the Meeting of 23rd June, previously circulated in proof, were corrected and confirmed.

Retirement of the Director. (Minute 843.) With reference to the resolution passed at the last meeting: "That the Air Council should be moved to approach the Treasury whereby Parliament should be asked to vote a more adequate sum than that proposed" as a retiring allowance for Sir Napier Shaw, the Chairman read a letter from the Treasury stating that Their Lordships were unable to see their way to increasing the proposed grant of £2,000.

The Committee was unanimously of the opinion that the Treasury letter should not be regarded as final, but that the Air Council should be asked to continue the correspondence.

The case of an officer at the Admiralty in similar position before the war was cited, and it was stated that after prolonged correspondence the Treasury had in this case agreed to increase the allowance.

It was further suggested that the representatives of the other Departments represented on the Committee, viz., the Admiralty, the Royal Society, the Ministry of Agriculture and Fisheries, and the Board of Trade, should be asked to take up the matter, and it was agreed that a covering letter to this effect should be sent when the Minutes of the meeting were circulated, if the Air Council letter to the Treasury should prove unsuccessful.

It was further agreed that, if these means proved ineffective, the Secretary of State should be requested to take up the matter personally.

Royal Aero Show. (Minute 861.) The Committee expressed its appreciation of the meteorological exhibit at the Royal Aero Show, which had proved of very considerable interest, and it was resolved to express the thanks of the Committee to the Director, and to the members of the staff concerned, for making so valuable a contribution.

853. METEOROLOGICAL COMMITTEE. **Appointment of Vice - Chairman.** (Minute 843.) Reported—that the Air Council approved the recommendations set out in Minute 836 as to the Constitution and Functions of the Meteorological Committee, including the suggestion made by the Royal Society that the Vice-Chairman should be elected from among the representatives of the scientific societies.

The Chairman proposed Sir Arthur Schuster, a representative of the Royal Society, for the office of Vice-Chairman, and the nomination was unanimously approved.

It was agreed that a letter should be sent to Sir Arthur Schuster, informing him of his election, and asking if he would be willing to accept the appointment.

854. FINANCE. **Royal Agricultural Show.** (Minute 851.) Reported—that authority had been received from the Treasury by telephone for the two representatives of the Office at the Agricultural Show at Darlington to be granted increased subsistence allowance for the period of their stay at Darlington, and an exhibit had accordingly been sent to the Show.

The following letter which had since been received from the Treasury was read :—

S. 531. (File 51297.)

TREASURY CHAMBERS,
30th June, 1920.

Sir,

I have laid before the Lords Commissioners of His Majesty's Treasury your letter of the 18th instant (51297/20. F.M.2) further relative to the attendance of Meteorological Office representatives at the Royal Agricultural Society's Show at Darlington.

In reply, I am to request you to inform the Air Council that, as My Lords understand that arrangements have already been made for the attendance of two officials, They sanction the payment to them of subsistence allowance at the rate of 25s. for the first five nights and 20s. for subsequent nights.

I am, however, to state that My Lords do not understand what is the nature of the exhibit in question, or what purpose it serves, and that on Their present information they are not prepared to sanction its continuance in future years.

I am, &c.,
M. G. RAMSAY.

The Secretary,
Air Ministry.

A report drawn up by the professional assistants who had been in charge of the exhibit was submitted, together with a covering Minute from the Superintendent of Statistics, as follows :—

Royal Agricultural Show.

There has been an exhibit of this character for many years. It used to be arranged by Mr. Marriott, Secretary of the Royal Meteorological Society. When the Office took over from the Society the responsibility for the climatological stations throughout the country in 1911 this duty was also assumed.*

The justification for the exhibit is that for the Show itself. It promotes the scientific study of agriculture throughout the country. The very possibility of agriculture being carried on at all depends on climate, and it is highly desirable for the farmer to learn what sources of information about climate and its relation to crops are open to him.

It may be added that the Office has to learn as well as to teach, and the fact that we are brought directly into touch with agricultural problems by this Show has a good effect.

I hope that this exhibit will be regarded by agriculturists and others as showing that the interests of the Meteorological Office have not been narrowed by its association with one particular Ministry.

F. J. W. WHIPPLE,
Superintendent of Statistics.

THE EXHIBIT.

(i) *The Climatological Station.*

The enclosure contained all the instruments used at a normal climatological station and observations were made twice daily.

* Extract from letter M.O. 1901/1912 from Royal Agricultural Society of England, May 24th, 1912 :—

“ An intimation has to-day been received from the Secretary of the Royal Meteorological Society stating that, as a great deal of their work has now been taken over by the Meteorological Office, it will not be possible for that Society to exhibit at the forthcoming Doncaster Show, which opens on Tuesday, July 2nd, and terminates on Saturday, July 6th next.

Notice was too short for an exhibit in 1912. The Office made an exhibit at Bristol, 1913 ; at Shrewsbury, 1914 ; Cardiff, 1919 ; and now at Darlington, 1920.

List of Instruments in the Enclosure—

Stevenson screen, containing thermograph, hygrograph, max. and min. thermometers, dry and wet bulb psychrometer.
 8 in. raingauge and hyetograph.
 Sunshine recorder.
 Solar max. thermometer.
 Earth thermometers, 1 ft. and 4 ft.
 Grass min. thermometer.
 Electrical cup anemometer, recording inside the hut.
 A photograph of the enclosure is attached.

Rainfall and other data as required were supplied to newspaper reporters and assurance agents (the fact that both gauges gave similar readings justifying their accuracy for these purposes). Short accounts of the methods of observing and explanations of the instruments were given to parties of people and were much appreciated. Pilot balloon ascents were made daily at 3 p.m., their many objects being explained to the large interested crowd they caused to congregate round the enclosure.

The value of the exhibit lay in the fact that it enabled the farmer to avail himself of seeing, *in working order*, the latest and best meteorological instruments, thus giving him the opportunity of keeping his climatology up to date and of co-operating with the Office.

(ii) The Stall.

As usual, the stall occupied two bay recesses (each 14 ft. by 10 ft.) with the portion between the recesses removed and leaving wall and counter space on three sides. (*See photograph attached.*)

The total wall space, amounting to about 150 sq. ft., was covered with charts, diagrams, records and photographs arranged under such broad headings as "Weather and Crops," "Autograph Records," "Louth," "One Day's Sunshine," "The Weather in the Making," and "Yesterday's Weather."

As complete a set as possible of the Office publications was on show. Circulars and pamphlets, *e.g.*, "Forecasting for Farmers," "Arrangements for the supply of D.W.R. for use in Schools and other Educational Provisions" and "Circulation to newspapers and news agencies of evening reports from Health Resorts" were taken for distribution.

(iii)

By the consent of the President of the R.A.S.E. a D.W.R. frame was erected outside the Members' hut and the "Forecast for Farmers" circulars set out on the table inside.

The display of instruments, accompanied by working explanations throughout, included the outfit of any normal climatological station of the first order, in addition to a few instruments of more elaborate character used at our Observatories, etc.

Telegrams giving early morning, middle day and the "further-outlook" forecasts were received from London daily and immediately posted up in the Members' hut, at our own stall, and near the enclosure.

The D.W.R. (British and International Sections and the Upper Air Supplement) were so arranged, under the heading "The Weather in the Making," that the course of the weather could be easily followed every day.

The results of the pilot balloon ascents, made daily at 3 p.m., were immediately posted up, and a model representing the velocities and the direction of the wind at their respective heights correspondingly adjusted.

It is perhaps desirable to put on record what proved to be the most popular sources of attraction and interest.

The "Louth disaster" was much appreciated by the general public. Under the heading "Louth" was included the rainfall of the district, the hyetograph record at Leyland (nr. Preston), the D.W.R. maps tracing the passage of the depression, and a few interesting photographs. "One Day's Sunshine," the electrical cup anemometer, and G. A. Clarke's "Cloud Photos," were decidedly popular. The farmers, as opposed to the general public, were more concerned with our arrangements for giving "Harvest Forecasts" and the diagrams of weather and crops. There is no doubt that the scheme of forecasting for farmers is inadequately advertised, and this R.A. Show gives a golden opportunity of bringing it to the notice of farmers and soliciting their co-operation in such matters.

Many observers made a point of visiting the stall and seeking answers to their queries.

Another year it would perhaps be advisable to inform observers of our exhibit at this Show, thereby giving opportunity to those who were suitably situated of meeting representatives of the Office if they so desired.

N. H. SMITH.

The Committee was of the opinion that, as the question had only been raised with the Treasury on a small matter, *viz.*, the increase in subsistence allowance, Their Lordships were probably unaware of the full nature of the case; and it was agreed that the report should be submitted to the Air Council for transmission to the Treasury, pointing out the justification for the exhibit and recommending its continuance in future years. In the event of the Treasury still declining to sanction the expenditure for the future, it was agreed that the Ministry of Agriculture should be asked to take up the matter.

Adjustment of the Estimates to provide for the Supply of Instruments on Repayment. It was reported that some provision was necessary for the supply of instruments on repayment; in putting down the estimates for 1919-20, and again for 1920-21, it had been thought best to confine the expenditure on instruments to the anticipated charge on the Exchequer, and £1,000 had been

included for instruments for Air Ministry use only, a sum being included also in "appropriations-in-aid," representing a percentage on the anticipated supply on repayment.

The Finance Department now suggested that when this £1,000 had been spent, whether for instruments for the Air Ministry or for other people, the operation must come to an end because the receipts, being carried to Air Ministry "appropriation-in-aid," could not be set against expenditure under Vote 5C.

It was stated that this course of action would completely paralyse the operations of the Instruments Division of the Office, and would destroy the influence of the Office with the Dominions Overseas and with foreign establishments.

The finance representative stated that in future years the difficulty could be met by estimating for the amount for the sale of instruments in appropriations-in-aid, and also in the estimates for the amount for the purchase of instruments, but agreed that some other provision was necessary during the current year.

The Committee was agreed that nothing must be done to prejudice the relations of the Office with Colonial and Dominion Governments and foreign countries, and that the arrangements for the adjustment should be taken up with the Finance Department on that understanding.

855. CORRESPONDENCE. *Hydrographer. Sub-Committee to consider the code for the transmission of meteorological observations by wireless telegraphy from ships at sea.* (Minute 842.) Reported—that in the course of various meetings to consider the re-opening of the service of meteorological reports by wireless from ships, a form of message had been proposed and provisionally accepted on the same lines as the messages from land stations prescribed in Annexe G of the Convention of Aerial Navigation. A copy of this code had been forwarded to the Hydrographer, with a covering letter, M.O. 29952, asking whether the proposed messages and codes would be accepted by the authorities in charge of the ships called upon to observe.

The following letter received from the Hydrographer in reply was submitted :—

N.M.S. 85/20. M.O. 30840.

HYDROGRAPHIC DEPARTMENT,
ADMIRALTY,

26th June, 1920.

Sir,

In reply to your letter of the 1st instant, relative to the re-introduction of the transmission of meteorological observations by wireless telegraphy from ships, and more particularly from H.M. ships and vessels, I beg to inform you that in the opinion of this Department a simple code on the lines of Admiralty Circular 150, M. 3849, of 20th December, 1906, and the Marine Observer's Handbook, 1918, M.O. 218 (2nd Edition, p. 109), supplemented and improved in accordance with present requirements, would appear to meet all the necessities for the transmission of marine meteorological observations and be amenable to general adoption at sea.

2. It is observed that the proposed Code M.O. 2610 demands from the seamen much detailed and complicated observing and coding, and that consequently it is of too complicated a nature for adoption by H.M. ships.

3. Further, the adoption of such a code as is suggested in M.O. 2610 would involve radical alterations in the logs of H.M. ships, causing much trouble and considerable expense. The description of weather by means of the Beaufort notation and the international symbols has the merit of universal application, and the familiarity of the seamen.

4. It is proposed, therefore, that a small marine committee representing—
The Marine Department, Meteorological Office ;
The Marine Department, Board of Trade ;
The Naval Meteorological Service,

be appointed to meet at an early date to consider the preparation of a suitable code, bearing in mind its proper and practical application and ultimate utility to seamen, and the advancement of meteorological science generally.

5. As it is important that the new meteorological code in the form ultimately approved should be capable of extension to other countries, it is suggested that it be referred to the International Maritime Meteorological Commission for consideration and acceptance, and that in the preparation of same due attention may be given to the Minutes of the meeting of the above Commission as held at Paris in October of last year.

6. Referring to paragraph 4 respecting constitution of proposed Committee, it might appear desirable that other interests also be represented, such as Aerial Navigation, Land Communication, etc., for the purpose of ensuring that as much co-ordination as possible may be brought about, the problem being to a large extent a general one.

I am, &c.,

F. C. LEARMONTH,

Hydrographer.

The Director,

Meteorological Office.

In accordance with the suggestions put forward in the letter a sub-committee had provisionally been appointed, consisting of representatives of the Marine Department, Board of Trade; Naval Meteorological Service; Controller of Communications, Air Ministry; Marine Division, Meteorological Office; Forecast Service, Meteorological Office; and it was hoped to hold a meeting of the sub-committee on 4th August.

The appointment of the sub-committee as set out above was approved.

The President asked whether ships were still as dependent on meteorological reports as in years gone by, and it was stated in reply that though from the point of view of safety of life the need of the reports was decreasing, yet a knowledge of the meteorological conditions prevailing on the route might enable a ship to effect considerable economy.

856. ANNUAL REPORT 1919-20. (Minute 845.) Revised copies of the text of the Annual Report were circulated to the Committee.

A paragraph put forward by Colonel Gold as an alternative to the text of part of pp. 17 and 18 of the report was submitted, and after incorporating some suggestions of Colonel Lyons the amendment was approved.

It was reported that Appendix I. of the report, viz., the recommendations of the Sub-Committee of the Research Committee of the Committee of Home Affairs, was still omitted, as permission to publish the document had not yet been obtained from the War Cabinet.

The Committee agreed as to the value of adding the report, as the recommendations had been an operative document in the arrangements for the co-ordination of the meteorological services, and it was agreed to insert it as an appendix when the necessary permission had been obtained.

Certain minor corrections were made, and authority was given for the signature of the report.

857. OFFICE STAFF. Report of the Sub-Committee on the Conditions of Service of the Clerical and Technical Staff. (Minute 848.) The following report was submitted:—

REPORT.

Introductory.—1. The staff of the Meteorological Office is at present broadly divisible into two sections:—

- (a) The Professional or Scientific grades, whose pay and conditions of service have recently been settled in accordance with the recommendations of a Committee appointed by the Treasury, under the chairmanship of Sir T. L. Heath, and
- (b) The Clerical and Technical grades, whose future pay and conditions of service we have been appointed to consider.

2. It may be convenient to state here the present grades and rates of pay of the Clerical and Technical staff, in order that the scope of our investigations may be more readily understood.

<i>Grade.</i>					<i>Scale of Pay.</i>
Principal Clerks					(Civil Service Bonus is payable in addition.) £225-£275 (Special maximum of £300 and £330 for exceptional cases)
Staff Assistants					£175-£200
Staff Clerks					£125-£150
Clerk Assistants					£75-£150
Clerk Computers					£75-£110
Mechanical Assistants					25s.-56s. a week
Boy or Girl Probationers					17s.-20s. a week in provinces (2s. additional in London)
Boy or Girl Clerks and Boy Assistants ..					12s. 6d. or 15s. 6d.-20s. in provinces (2s. additional in London).

It will be observed that the highest rate of pay which can be attained by a member of the staff is £330 per annum, plus bonus. Even so, the prospects of attaining this salary are not normally equal for all new entrants, as Boy Clerks have poorer prospects of promotion than the better-educated Boy Probationers.

3. These grades are unestablished, and, although in effect permanent, are engaged under terms which enable their appointments to be terminated, if desired, at three months' notice. The Office has a scheme of superannuation, which applies to the grades down to, and including that of, Clerk Computer; but it is not so advantageous to the staff as the superannuation regulations applying to the established civil servant, and, in addition, it has been laid down that the maximum pension which can be awarded to a retiring member of the staff cannot exceed £150, although an increase on account of war bonus to £187 10s. 0d.* has since been sanctioned by the Treasury.

General Observations.—4. We are of opinion that the present scales of pay are inadequate, and that in future the remuneration and general conditions of service of the staff should be the same as those proposed for civil servants employed elsewhere in Government Departments upon work which, for this purpose, can be regarded as comparable.

5. The terms of our reference directed us to consider the possibility of bringing the staff of the Meteorological Office into line with existing civil service classes, but in view of the impending reorganisation of those classes, consequent upon the report of the National Whitley Council Reorganisation Committee, our attention was of necessity directed to the new grades by which the civil service will be staffed in future in accordance with the recommendations of that Committee. Their report provides for three main classes—an administrative class, an executive class, and a clerical class—and it is generally understood that the broad principle of organisation to be followed is that a department shall be staffed either by the administrative and clerical classes, or by the executive and clerical classes. In the Meteorological Office the professional grades fulfil the functions corresponding to those proposed for the administrative class in an ordinary civil service department; and it fell to us to consider, therefore, in the first place, the desirability of recruiting from the proposed new clerical class to meet the future needs of the Office, so far as the work of the clerical and technical classes is concerned.

6. The "Whitley" report provides for the following grades and rates of pay, where the "clerical" class is employed without the "executive" class:—

<i>Grade.</i>	<i>Scale of Pay.</i>
	(Civil Service Bonus is payable in addition.)
Higher posts (title not yet settled)	£400—£500
Higher grade of the clerical class	£300—£400
Clerical class	£80—£250
	(Starting pay to be £60 for new entrants who have not attained 18 years of age.)

And a comparison of these rates with those current in the Office at the present time (*see* paragraph 2) shows that the introduction of these classes would provide a substantial improvement in the pay of the staff. We are satisfied that the rates of pay shown above would provide adequate remuneration for the work.

7. Remuneration was not, however, the only question we had to consider, as we regarded it of the utmost importance to ensure that any method of recruitment should provide new entrants suitable for the work, and possessing initial educational qualifications adequate to ensure the maintenance of the efficiency of the Meteorological service, especially in view of the probable future development of the service. In this connection it is necessary to state that, while the word "technical" has been used in the Office in the past as a convenient term for distinguishing the work of observing and computing from the clerical work, we found that its use may be misunderstood as applied to the work normally falling to the so-called "technical" classes, since the preliminary specialised study can be followed in the Office and proficiency attained after a reasonable period, provided new entrants possess suitable educational qualifications.

8. Having arrived at this conclusion, it became necessary for us to know what educational qualifications will be required of the new clerical class, and on this question we had the benefit of the informal advice of Mr. L. Blaikie, Assistant Director of Examinations at the Civil Service Commission. We understand that the clerical class will be recruited from boys who have completed four years (normally between the ages of twelve and sixteen) at a secondary school, and that the syllabus of examination will probably include English, Mathematics (including Elementary Trigonometry), Science (including Physics), and one foreign language. The examination will be a competitive one; and, judging from the experience of competitions for similar classes in the past, the persons appointed to the class will be the most able of a large number of candidates. Mathematics and Science are the most valuable subjects for the purpose of service in the Meteorological Office, and we understand that there would be no difficulty in assigning to the Office successful candidates who showed special proficiency in these subjects at the examination, if a formal request for this were made to the Civil Service Commissioners.

9. In view of the foregoing considerations we are of opinion that persons possessing the educational qualifications essential for new entrants to the Meteorological Office can be obtained from the candidates for the clerical class. We note that provision is made in the "Whitley" report for new entrants on this class to be subjected to a strict probation of one year, and that if found unsuitable during that period they can be assigned elsewhere or discharged.

* Application has been made to the Treasury for the further raising of this maximum in view of the concessions granted to established civil servants for the counting of war bonus for pension purposes.

Recommendations.—10. We recommend that an established staff should in future be recruited from the new “clerical” class—subject to the proviso in the final sentence of paragraph 8, and that the existing staff, including probationers and boy and girl clerks and boy assistants, should be re-graded upon that class as established civil servants (so far as is practicable under the regulations of the Treasury). We recognise that under this recommendation a member of a “clerical” grade will under certain circumstances be receiving more salary than a member of the professional staff to whom he will be subordinate. Such a situation is common throughout the civil service in departments where clerks of the First Division are employed, and should not give rise to any difficulty.

We do not desire, however, that this recommendation should be regarded as preventing altogether the admission into the non-professional grades of the Office of persons specially attracted to the science of Meteorology whom it may from time to time be found desirable and advantageous to employ under special conditions of service and remuneration.

11. We recommend also that every consideration should be given to the question of allowing the existing staff to count past service in the Office for ordinary civil service pension on establishment in the clerical class, if such establishment be approved. We understand that the Treasury will not establish officers who are already over fifty years of age, and we assume that any such officers will retain their rights to pension under the present superannuation regulations of the Office; but in other cases we think that service should count for civil service pension as from the date of appointment to a class in the Office normally carrying rights to a pension under the superannuation regulations of the Office (i.e., the classes of Clerk Computer, Clerk Assistant, Staff Clerk, and above).

12. So far as the starting pay of the existing staff on the new scales is concerned, we consider every effort should be made to have applied to the staff of the Meteorological Office any formula agreed upon in connection with the assimilation of established civil servants upon the new grades created under the report of the Whitley Reorganisation Committee.

13. We are of opinion that the question of promotion from the clerical grades into the professional grades should be carefully explored, in the interests both of the staff and of the service. Since the attainment of a degree in science is normally essential for promotion to the professional grades, we consider the staff should be actively encouraged to pursue their studies to this end. Suitable provision should be made for the staff to be interchangeable for the benefit of men at remote stations, who may find inadequate opportunities of continuing their education. We also recommend that some recognition should be given (probably by the grant of additional increments of salary) for educational success in scientific subjects directly bearing upon meteorological work.

14. We find it has been the practice in the past to grant special rates of pay for duties performed at early and late hours and for Sunday and night duties. These duties are some of the most important and most responsible that fall to the staff, and, apart from the generally accepted principle that higher pay should be given for duties at inconvenient hours, we recognize that it is essential for the best men to be encouraged to undertake them, and that they should be suitably remunerated. In view of our desire to report to the Meteorological Committee at the earliest possible moment, we have not been able fully to consider whether or not any change in the present basis of payment is desirable, but we presume this matter can be adequately dealt with without further formal consideration by us.*

(Signed) F. H. SYKES (*Chairman*).

NAPIER SHAW.

W. D. BEATTY.

H. G. LYONS.

F. H. NUTT.

L. V. MEADOWCROFT.

(Signed) W. F. JENKINS,

Secretary.

The members of the Committee present at the meeting signified their concurrence to the recommendations put forward in the report, but agreed that the other members of the Committee should be asked to express their opinion before formal approval was given.

It was agreed, therefore, to circulate the report to the absent members, with a covering letter asking them to forward any modifications or suggestions at an early date, so that action might be taken in the near future.*

Resignations. Reported—that the following resignations had been accepted: **Mrs. E. V. Newnham** (Minute 754), Senior Professional Assistant attached to the Statistical Division, with effect on 1st August, 1920. (Order 1132.)

Mr. L. F. Richardson (Minute 765), Assistant Superintendent at Benson Observatory for the investigation of experiments in computation of sequence of weather by numerical process, with effect on 1st September, 1920. (Order 1144.)

Director's Orders for Confirmation. Reported—the following —

Promotions:—1141. Promoting **C. F. J. Jestico** (Minute 821), Clerk Assistant at Calshot, to Staff Assistant, at a commencing salary of £175, with normal war bonus, with effect on 1st July, 1920.

* The concurrence of the members not present at the meeting was subsequently obtained. (File 229840/20.)

1142. Promoting **J. B. Beck** (Minutes 574 and 639), Boy Clerk at Eskdalemuir, to Clerk Computer, at a salary of £75 per annum, with normal war bonus, on probation for one year as from 5th June, 1920.

1151. Promoting **E. L. Clinch** (Minute 821), Clerk in the Instruments Division, to Staff Assistant, at a salary of £175 per annum, with normal war bonus, as from 16th August, 1920.

1155. Promoting **B. Francis** (Minute 568), Staff Assistant at Kew Observatory, to Principal Assistant, at a salary of £225 per annum, with normal war bonus, and transferring him for duty in the Instruments Division as from 16th August, 1920.

1159. Promoting **A. A. Lovie** (Minute 754), Clerk in the Forecast Service, to Staff Assistant, at a commencing salary of £175 per annum, with war bonus in addition, as from 14th July, 1920.

1160. Promoting **W. J. R. Pook** (Minute 765), Clerk Assistant in the Accounts Section, to Staff Assistant, at a salary of £175 per annum, with war bonus in addition, as from 19th July, 1920.

New Appointments. 1156. Appointing **William James Grassick**, Junior Professional Assistant, at a salary of £175, with normal war bonus, as from 3rd August, 1920.

Reported also the following appointments as Technical Assistants at a salary of £75 per annum, with normal war bonus. The appointments being on probation for a period of three months, and subsequently terminable by three months' notice on either side.

1123. **Henry George Lacey** (born 7th November, 1892), to report at the Meteorological Office H.Q., on 21st June, for subsequent duty at Bedford.

1124. **William Arthur Lewis Marshall** (born 7th November, 1897), for duty in the Forecast Service, as from 21st June, 1920.

1127. **Philip Francis Jarrold** (born 25th September, 1900), for duty at Croydon, as from 14th June, 1920.

1129. **George Leslie Major** (born 24th April, 1901), for training at Croydon, with a view to subsequent duty at Cattewater. The appointment to date from 19th June, 1920.

1134. **Cecil John George Budd** (born 27th December, 1900), for duty at Kew Observatory, as from 23rd June, 1920.

1135. **Frank Bourne Swain** (born 8th December, 1899), for duty at Kew Observatory, as from 23rd June, 1920.

1137. **W. H. Bigg** (born 4th November, 1900), for duty at Kew Observatory, as from 5th July, 1920.

1138. **Wilfred Harold Jupe** (born 6th July, 1900), for duty at Cranwell, as from 21st June, 1920.

1139. **Trevor Rogers** (born 7th July, 1899), for duty at South Farnborough, as from 30th June, 1920.

1146. **Charles Smith** (born 28th April, 1893), for training at Cranwell, as from 3rd August, 1920, with a view to subsequent duty at Grain.

1147. **Wilfred Laurier Lineham** (born 29th May, 1902), for training and subsequent duty at Cranwell, as from 16th August, 1920.

1148. **Frank Husband** (born 11th February, 1901), for training at Croydon, as from 16th August, 1920, with a view to subsequent duty at Cattewater.

1149. **Frederick William Jude**, for training and subsequent duty at South Farnborough, as from 26th July, 1920.

1150. **Charles Wilde** (born 24th January, 1901), for training at Kew Observatory on 19th July, 1920, with a view to subsequent duty at Calshot.

1152. **Herbert Leslie Pace** (born 3rd November, 1894), for training and subsequent duty at Cranwell, as from 10th August, 1920.

Attachment. **C. W. Atkins**, Storeman, is attached to the Meteorological Office for duty, and is posted to Instruments Division as from 28th June, 1920. (Order 1153.)

G. E. Court, Storeman, is attached to the Meteorological Office for duty, and is posted to Instruments Division as from 5th July, 1920. (Order 1154.)

Approved.

858. OBSERVATORIES AND STATIONS.

Edinburgh. The work of the Meteorological Office, Edinburgh, which had been carried on at 122, George Street, in the rooms lent by the Scottish Meteorological Society, was transferred to the new offices in Rothesay Place on 26th June, 1920; the address from that date is: Meteorological Office, 10, Rothesay Place, Edinburgh. The house has been rented for one year by the Office of Works for the purpose.

Manchester. The name of the Aerodrome at Alexandra Park has been altered from "Didsbury Aerodrome" to "Manchester Aerodrome." The postal address remains unchanged.

South Stack Lighthouse. Reported—That in accordance with the decision of Minute 840, a letter, M.O. 29621, had been sent to Trinity House, pointing out that the Committee, while sympathetic with the suggestion that both the Office and the Elder Brethren were interested in making provision for the display of the Gale Signal at South Stack, had found themselves unable to agree to the proposal that the

cost should be divided between the Office and the Elder Brethren, as such a proposal was not within the conditions governing the issue of gale warnings. A letter had been received in reply stating that in view of the opinion expressed in the Director's letter, the Elder Brethren had agreed to erect the wall at their own cost.

Gale Warning Stations. (Minute 822.) Reported—That the issue of gale warnings to the various stations situated round the coasts of the British Isles had been much hampered by the lack of telegraphic facilities for the delivery of the messages after 7 p.m.

Arrangements had been made with the Post Office for the delivery as from 1st July of telegrams between 7 p.m. and 10 p.m. to about 70 stations at which no special attendance was required; the total estimated cost being £46 11s. 2d., which would be chargeable against the sum of £6,700 provided in Vote 5C for Postage, Telephones, &c.

It was further reported that arrangements had been made with the Hydrographer to resume (as from 1st May, 1920) the pre-war practice of issuing gale warnings direct to the recipients in the case of Coast-guard stations to which warnings had been transmitted since April, 1919, by way of experiment through the District Intelligence Officers; and that the Post Office had accordingly been asked to furnish an estimate for the extension of the arrangements detailed above to these stations also.

Approved.

Eskdalemuir. *Provision of furniture for the Superintendent's House.* Reported—that, owing to Mr. Richardson's resignation and his desire to have his furniture from the Observatory at Eskdalemuir, some further arrangement was necessary for the furnishing of the superintendent's house at Eskdalemuir.

It was stated that when Mr. Richardson, who had held the position of Superintendent of Eskdalemuir from 1913-1916, resigned, he was not at the moment in need of his furniture, and an arrangement was made by which the furniture remained at the Observatory and the use of it was allowed to Dr. Crichton Mitchell, the newly-appointed superintendent, on certain terms, viz., the Office made a payment to Mr. Richardson of £30 per annum, and Dr. Mitchell undertook the obligation of making good any detriment beyond ordinary wear and tear. (Minute 574.)

A letter from Dr. Crichton Mitchell (M.O. 31502) was submitted, in which it was suggested that in consideration of the isolated position of the Observatory, of the fact that any set of furniture would not suit the rooms, and of the high cost of transporting furniture to and from the place, that the following arrangement should be made:—

- (a) That the superintendent's quarters be furnished, at departmental cost, with all the necessary articles, except bed and table linen, china, table crockery and furnishings, cutlery, glass, and cooking utensils.
- (b) That the articles supplied at departmental cost be made good as required from time to time at departmental cost.
- (c) That the superintendent for the time being should pay a rent for the use of the articles supplied, this rent being fixed at, say, 5 per cent. of the initial outlay.

It was stated that on receipt of the letter the Office of Works had been asked for an estimate of the cost of furnishing according to a schedule enclosed with Dr. Mitchell's letter, and that the estimate was £850. The Finance department had further stated that the charge would be $7\frac{1}{2}$ per cent. on the capital value of the furniture, &c., supplied for the superintendent's use, and that Treasury authority would be required, and might be difficult to obtain.

The Committee considered Dr. Crichton Mitchell's proposal, but in view of the difficulties foreseen, and especially of the fact that in some cases it might be inconvenient for a superintendent if he were appointed to a post where there was a furnished house for which a considerable rent had to be paid, it was agreed that the suggestion should not at present be accepted.

859. INTERNATIONAL METEOROLOGICAL COMMITTEE. Commission on Weather Telegraphy. Reported—that at the meeting in Paris in October, 1919 (Minute 785), a Commission on Weather Telegraphy had been appointed as follows:—Colonel E. Gold (President), M. Angot, Colonel Blandy, Prof. E. van Everdingen, General Ferrié, Captain Franck, Senor Galbis, Lieut. Grant, M. Goutereau, Dr. Hesselberg, Dr. Marvin, Colonel Matteuzzi, Prof. A. de Quervain, Captain Ryder, Dr. G. T. Walker, M. Wallén.

Colonel Gold reported the receipt of a letter from M. de Quervain, suggesting that the Commission should meet at an early date, and stated that in consultation with the Director it had been decided that it was desirable to

hold a meeting early in the autumn, and that the week beginning 20th September was provisionally suggested. He further stated that the expenses of members were borne by their own services, and no financial provision was required.

The suggestion to hold a meeting of the Commission in September was approved.

860. PUBLICATIONS. **Cloud Forms.** (Minute 700.) Reported — that the stock of Cloud Forms (M.O. 233) was considerably reduced and, a new edition being required, it was proposed to add a note on Eddy Clouds, with six blocks of photographs taken by Captain C. K. M. Douglas, which were already published in the Manual of Meteorology; and also an additional sketch by Mr. Clarke of a Mammilated Squall Cloud.

It was stated that it was considered desirable to effect some considerable improvement in the printing of the Cloud blocks, which were not at present satisfactory, and that the representative of the Stationery Office had stated that in order to secure the best work it would be necessary to go outside the contract conditions, with a consequent increase in cost.

The Committee agreed that the publication was of considerable value, and that there was likely to be a large demand for it, and they therefore authorised the Director to recommend to the Stationery Office that they should endeavour to obtain the best work by going outside contract conditions, and that the price of the publication should be correspondingly increased.

It was suggested that some additional notes should be inserted to make the publication of interest to schools.

New Issues. Reported—the following :—

M.O. 231D. **Geophysical Journal**, 1918.

Proofs of the following were laid on the table :—

M.O. 236. **Book of Normals**, Section III.

M.O. 239. **Minutes of the International Meteorological Conference in Paris.**

861. DIRECTOR'S REPORT AND ACCOUNTS.

The following letter has been received from the Assistant Secretary to the King :—

H.M. Yacht *Victoria and Albert*,
11th July, 1920.

Dear SIR NAPIER SHAW,

With reference to the enclosed Daily Report which was sent to the King, is there not some mistake in the rainfall at the places which His Majesty has marked with a red cross?

Yours very truly,

CLIVE WIGRAM.

SIR NAPIER SHAW, LL.D., Sc.D.,
Director, Meteorological Office.

The entries noted as doubtful by His Majesty proved to be erroneous on account of the displacement of the decimal point on conversion by an inexperienced clerk. Apology has been offered and a corrected table sent.

Visit to Edinburgh and Eskdalemuir. Reported—that the Director visited Edinburgh on 6th July to receive the honorary degree of Doctor of Laws conferred upon him by the University, and had utilised the occasion for a meeting of the Committee of the Meteorological Office, Edinburgh.

He proceeded to Eskdalemuir on 8th July, and spent two nights at the Observatory.

The Committee offered their congratulations to the Director on the honorary degree.

Committee of the Meteorological Office, Edinburgh. The Minutes of the Committee are as follows :—

COMMITTEE FOR THE METEOROLOGICAL OFFICE, EDINBURGH.

SIXTH MEETING.

Minutes of Meeting held at the Meteorological Office, Edinburgh (10, Rothesay Place), on Wednesday, 7th July, 1920, at 11.0 a.m.

There were present—

SIR NAPIER SHAW (in the Chair).
DR. C. G. KNOTT.

PROFESSOR R. A. SAMPSON.
DR. E. M. WEDDERBURN.

MR. A. WATT, *Secretary*.

The future Work of the Edinburgh Office. The Chairman explained that the establishment of a Geophysical Station in Shetland in the immediate future was in contemplation ; that the sum assigned for the purpose in the estimates was insufficient to meet salaries in connection with the scheme ; that it was proposed to consolidate the work going on in different establishments in Scotland, and to concentrate in Edinburgh a larger staff than had at first been contemplated ; and that Dr. Crichton Mitchell had agreed to act as Superintendent of the Edinburgh Office, organise the work in Shetland, and retain the oversight of Eskdalemuir Observatory.

Dr. Mitchell reported on a visit recently made to Shetland, and indicated the proposals he had submitted for a principal station near Lerwick, and a subsidiary station at Hillswick. Some conversation took place as to climatological work and other matters.

The hope was expressed that the new Committee for the Edinburgh Office would be properly constituted at an early date, and that it would be possible for it to meet in October.

The Committee congratulated Sir Napier Shaw on receiving the honorary degree of Doctor of Laws from the University.

Accommodation. Reported—that Mr. Marshall, the representative of the Office of Works, visited the rooms occupied by the Meteorological Office at Kingsway on 9th July ; and subsequently a request was received that the Meteorological Office should prepare a scheme for a reduction of accommodation. The suggestion put to the Office was that it should vacate the accommodation which it occupies on the third floor, and confine itself to its rooms on the fourth and fifth floors only.

In view of the fact that accommodation for the Naval Meteorological Service (fifteen persons) will have to be provided in the near future, it is not considered practicable to accept the recommendation, and the alternative suggestion of vacating Rooms 415, 416, 426 and 425 has been made, though even this will be disadvantageous to the scientific work.

Gassiot Committee. A meeting of the Gassiot Committee was held on the 14th July, at 3 p.m., in the rooms of the Royal Society. The following were present : Colonel Lyons (in the chair), Sir Joseph Larmor, Sir Napier Shaw, and Messrs. C. Chree, G. W. Walker, and C. T. R. Wilson.

Sir Napier Shaw presented a report on the work of the observatories of the Meteorological Office, with a comparative statement of receipts and expenditure for the current and the previous year.

Dr. Chree made a special report on the magnetic work of the year, and mentioned the difficulty of getting instrument makers to tender for magnetic instruments, and the very high prices demanded.

It was decided to call the attention of the Royal Society to the desirability of there being more ample provision in this country for the manufacture of geophysical instruments.

Sir Napier Shaw gave an account of the investigations that had recently been made as to the best site for the proposed observatory in Shetland.

With regard to the recommendation put forward to the Royal Society Council regarding the construction of magnetic and geophysical instruments, Colonel Lyons reported that the Royal Society Council had agreed that it was a matter in which action could best be taken by members of the Gassiot Committee, who were also members of the Meteorological Committee, and that they were therefore taking no action in the matter.

Royal Aero Show. (Minute 852.) In connection with the Air Ministry Exhibit at the Royal Aero Show at Olympia, 9th to 20th July, a Meteorological Exhibit was shown, consisting of—

- (a) The equipment of an upper air station, such as Croydon.
- (b) Map showing weather conditions over N.W. Europe.
- (c) Board showing hourly reports of weather from stations on aerial routes.
- (d) Various charts and diagrams, including a chart of distribution of rainfall on the day of the Louth disaster.

Meeting at Paris. Anglo-French Conference, July, 1920. At the second conference between the British, French, and Belgian Civil Aviation representatives, which was held at Paris on the 5th-8th July, and at which Lieut.-Colonel Gold represented the Office, an arrangement was made for the use of a common form of abbreviated meteorological report by the French and British Services. These reports are issued hourly, or two-hourly, for use in connection with the Air Services between London—Paris—Brussels.

Rainfall Sub-Committee. (Minute 846.) The Minutes of the meeting of the Rainfall Sub-Committee held on the 24th June, previously circulated, were approved.

Marine Sub-Committee. (Minute 846.) The Minutes of the second meeting of the Marine Sub-Committee of the 17th June, previously circulated, were approved.

Staff Return, 30th June, 1920. The staff return to 30th June, 1920, is as follows :—

	Headquarters Vote 5C.			Outstations Vote 8G.		
	Establishment approved (Estimates 1919-20).	Sanctioned by Estimates 1920-21 but not established.	Appointed.	Establishment Estimates 1919-20.	Sanctioned by Estimates 1920-21 but not established.	Appointed.
Director	1	1	1	—	—	—
Assistant Director	2	2	2	2	2	2
Superintendent	9	9	9	3	3	1
Assistant Superintendent ..	5	5	5	9	10	2 + 1
Senior Professional Assistant	17	17	18	26	23	16
Junior Professional Assistant	12	12	8	11	12	2
Clerical and Technical on M.O. Establishment ..	68	68	60	116	116	47
Clerical and Miscellaneous unestablished	63	63	38	31	31	23
	177	177	141	198	197	93 + 1

Four resignations from the professional staff and one from miscellaneous will take effect before October 1st.

Three appointments to the professional staff and 15 to the clerical and technical staff have been arranged.

Submitted—the following statement of expenditure prepared by the Department of F.E. and statement of receipts prepared by the Accounts Division of the Office :—

Statement of Receipts for the Quarter ended 30th June, 1920.

1919 £ s. d.		1920 £ s. d.
108 10 0	Balance from year 1919-20	2,653 7 1
11,750 0 0	Parliamentary Vote	
	<i>Departmental Expenses Repaid—</i>	
16 4 10	Forecasts, &c.	35 16 8
40 3 2	Marine, Statistical and Administrative	39 19 7
236 2 5	Instruments	50 7 0
	<i>Incidental Expenses Repaid—</i>	
107 11 7	Daily Weather Report	110 16 11
42 6 5	Divisional	
	Postage	£ 2 18 10
	Carriage of Instruments	12 2 9
		14 18 9
		30 0 4
4 10 1	Advertising Account	14 14 0
68 5 11	Stationery Office	58 6 11
21 19 11	Telegraph Charges Repaid	21 14 3
60 19 10	Telephone Charges Repaid	13 8 11
8 0 0	Inspections	8 0 0
4,993 11 4	Instruments : By Sales from Stock	763 10 2
	<i>Superannuation Account—</i>	
133 2 6	Annuities	118 2 6
24 18 0	Interest on Investments	24 18 0*
	<i>Observatories, Branches, and Stations—</i>	
2 4 0	Kew	2 10 3
6 9 0	Valencia	10 0 0
7 3 3	Eskdalemuir	502 11 10
70 1 7	Miscellaneous	17 19 3
17,702 3 10		1,822 16 7

* Paid direct to Bank of England.

Statement of Expenditure on account of the Meteorological Services for Quarter ending 30th June, 1920.

Vote 8G.	Payments at Stations. April & May, 1920.	Direct payments from Air Ministry. Quarter ending 30th June, 1920.
	£ s. d.	£ s. d.
Instruments and Stores	17 0 11	100 6 4
Fuel and Incidentals	7 12 0	34 0 0
Postage, Telephones and Telegrams	16 6 6	190 11 8
Travelling and Transport	27 9 4	72 0 0
Wages and Salaries	22 11 9	5,863 4 11
Buildings, &c.		43 11 6
Total	£91 0 6	£6,303 14 5

Vote 5C.	
Wages and Salaries	£11,914 0 0

Ten stations have not yet rendered any account of expenditure, but of these only three have just received an imprest, so apparently no, or very little, expenditure for April and May has been incurred. No accounts for June yet received by the Finance Department for these stations.

Mr. Meadowcroft stated that he did not attach great importance to the statement in the above form, and proposed that in future a statement of the liability which was designed to indicate the progress of expenditure during the year should be substituted.

The Committee agreed that some statement as to the accounts of the Meteorological Office was desirable, and Mr. Meadowcroft was requested to prepare a liability statement for submission to the next meeting.

ONE HUNDRED AND FIFTH MEETING.

*Air Ministry, Kingsway, W.C.,
27th October, 1920.*

PRESENT :

THE CONTROLLER-GENERAL IN THE CHAIR.

THE DIRECTOR.

MR. McANALLY.

THE HYDROGRAPHER.

MR. MEADOWCROFT.

COLONEL LEWIS.

SIR T. MIDDLETON.

COLONEL LYONS.

DR. WEDDERBURN.

MR. BERTRAM was in attendance.

A letter of apology for absence was received from Captain Harvey.

862. The Minutes 852-861 of the Meeting of 28th July, previously circulated in proof, were confirmed.

Retirement of Sir Napier Shaw (Minute 852).—Reported—the receipt of the following letter from the Treasury :—

S. 137 Ref. 341313.

Treasury Chambers,
3rd September, 1920.

Sir,

I have laid before the Lords Commissioners of His Majesty's Treasury your letter of the 28th ultimo (197562/20/S.1) conveying the request of the Air Council for an increased grant to Sir Napier Shaw, late Director of the Meteorological Office.

In reply, I am to request you to inform the Air Council that it was only after the most careful consideration of all the circumstances that My Lords came to the decision communicated to Sir. N. Shaw in their letter of 29th March last, and that consequently they regret to be unable to depart from that decision.

I am, etc.,

The Secretary,
Air Ministry.

B. B. BLACKETT.

It was agreed that the only further action possible is for the Controller-General to approach the Secretary of State.

Appointment of Dr. G. C. Simpson as Director from 6th September, 1920.—The Controller-General extended a welcome to Dr. Simpson on behalf of the Committee.

863. PROGRAMME.—**Provision of £5,000 for Research.**—The Director proposed that an item of £5,000 for Research should be included as a separate item in the estimates. Of the £5,000, a sum of £1,800 was previously included in the estimates under other headings, so that a net addition of £3,200 only is involved. The Committee approved the principle of a separate item for Research, and left the fixing of the amount to be decided by the Director after consultation with the Finance Department.

Radio Research.—The Director reported correspondence with the Radio Research Board (File 34,444), who suggest that the Meteorological Office should extend the present radio investigation at South Farnborough in accordance with a scheme put forward by Mr. Watson Watt. The Director stated that in his view the radio-technical problem of detecting strays is not a meteorological research, and could not be properly supervised by the Meteorological Office. The Committee discussed three possible alternatives :—

- (1) The continuation of radio work by the Meteorological Office at South Farnborough and its extension to include general research in "Atmospherics."
- (2) The restriction of work at South Farnborough to the development and use of coils for thunderstorm location, leaving the investigation of "Atmospherics" and other radio problems to the Radio Research Board.

- (3) The discontinuance of all radio research by the Meteorological Office, leaving all radio research, including the location of thunderstorms, to be carried out by the Radio Research Board, the Meteorological Office to utilise and adapt the results obtained.

The Committee agreed to adopt the third alternative, and to allow the Radio Research Board the use of the radio station at South Farnborough, and, further, to second Mr. Watson Watt to the Board if that were desired.

Advisory Committee on Atmospheric Pollution (Minute 823).—A letter (File 26,380) from Sir Napier Shaw was read, suggesting that as the Meteorological Committee had approved of his continuing as Chairman of the Advisory Committee, the Meteorological Committee had no longer a formal representative on the Advisory Committee. It was agreed that Mr. Whipple should act in this capacity, and should report to the Director the progress of the work.

Establishment—*Memorandum by Sir Napier Shaw.*

OFFICE STAFF.

The most obvious deficiency in the organisation of the Office is the want of administrative assistance for the Director. Up to the time of the enlargement of the Office staff the four superintendents and the chief clerk could keep the routine work of the Office going and the Director was free to look into the general aspects of that work, to conduct the relations with authorities of all kinds external to the Office and to visit regularly the observatories or other establishments and to initiate any new work that he thought desirable there or at Headquarters.

During the war the administration increased and the staff diminished, and at the time of the transfer to the Air Ministry the Director's staff was reduced from a professional secretary with a confidential clerk and a shorthand typist, to two professional assistants, one acting as private secretary and one originally employed as mathematical expert and at the moment unattached. He had no clerical staff at his personal disposal.

Continuation on those lines is not now possible. The administrative work alone is far more than can be got through in the time available by the Director and the assistance at his disposal.

I would therefore suggest :—

(1) That one assistant director with adequate meteorological experience should be able to devote his whole official time to administration and personnel, and that he should have two deputy assistants to be graded as superintendents, one of whom, in addition to this work in administration, should take charge of Army relations which involve certain sides of technical scientific knowledge of a special character, and the other should be responsible for the Navy Services which require examination and organisation, because at present we know little of the position or prospects of meteorology in the various units of the Fleet, though it is obvious that there is a great field for useful work there, if the circumstances are fully known to both sides. The allocation of the whole time of an assistant director to the duties of administration and personnel implies the appointment of a new Assistant Director for the contributive stations, which include Observatories, Anemograph stations, Climatological stations (500) and Rainfall stations (5,000), Colonial stations, etc., and special expeditions from time to time; the contributions from ships would be included if the third assistant director is housed in Kingsway; if he is at South Kensington some modification is necessary, because when a deputy chief is nearly always absent irregularities grow up which neither the chief nor his deputy can properly control.

Provision is taken in the estimates for an assistant directorship to be held by Mr. W. H. Dines at Benson as Director of Experiments upon the upper air. But the post which he holds is really honorary as his pay is (by his own request) £200 a year plus war bonus. If the Treasury would consent to regarding him as Honorary Assistant Director and let us use the Assistant Directorship for the purpose of easing the burden of administration it would be desirable to adopt that plan.

(2) Another point that I wish to commend to the notice of the Committee is connected with the libraries. Dr. H. Jeffreys, M.A., Fellow of St. John's College, Cambridge, a member of the Council of the Astronomical Society, professional assistant in the Office since 1918, has been appointed to take over the duty of librarian at South Kensington on the departure of Miss Walker, M.Sc., senior professional assistant. It will be apparent to every one who looks into the matter that the opportunity afforded by the unique collection of books in the possession of the Office has not hitherto been exploited by any means to the full extent of its possibility, and Dr. Jeffreys has been charged with the duty not only of supervising the keeping of the catalogue and such other ordinary duties attaching to the post of librarian as any librarian undertakes, but also of keeping the Director and the scientific staff informed, by regular reports, of the subject matter of the material that comes into the library, and of keeping a look-out for material which has to be acquired.

Meteorology ranges over many subjects, and of all the contributions those which contain intricate mathematical treatment most require notice for the benefit of the Director and staff; hence the opportunity of securing the services of a mathematician of distinction for the position ought to be recognised by assigning an assistant superintendentship to it and in course of time a superintendentship; because the Office has not only the historical library at South Kensington, but also libraries of special kinds at Kew, Eskdalemuir and elsewhere. All these libraries are of vital importance for the work of a scientific staff, and they want skilled co-ordination and careful adjustment to meet special requirements. As the librarian becomes more and more acquainted with the need for co-ordination, the contribution which he

can render will become more extended and the duty would certainly require the holder of the office to have the status of a superintendent. For this the arrangement about Atmospheric Pollution could be regularised. The present superintendent holds an honorary post of £100 without war bonus. If that continues, the superintendentship on normal lines should become available.

2nd September, 1920.

NAPIER SHAW.

The Director stated that until he had had further experience in the work of the Office he did not feel in a position to act upon Sir Napier Shaw's suggestions, and it was agreed that the matter should be left over.

Training of Staff at Foreign Institutions.—Submitted—Correspondence (File 32,220) resulting from a suggestion made to Sir Napier Shaw that English meteorologists should have a period of training in Norway. The Director pointed out that up to the present it had not been possible to find sufficient staff to fill all the vacancies in the Meteorological Office, and no staff could at present be spared for foreign countries.

The Committee agreed that the scheme should not be abandoned, but that after further discussion between the Controller-General and the Director an attempt should be made to get the principle recognised, and to make all the necessary arrangements for recognition of such periods of training as counting for seniority and superannuation in the home service.

Seconding of Staff for the Imperial College (Minute 851).—Reported—that the following letter had been sent to the Treasury, asking for authority to second officers of the Meteorological Office for duty in connection with the School of Meteorology, but that no reply had yet been received.

256857/20/S.1.

Air Ministry,
9th July, 1920.

Sir,

I am commanded by the Air Council to acquaint you, for the information of the Lords Commissioners of the Treasury, that the Imperial College of Science propose to open a School of Meteorology in association with the School of Aeronautics recently established to give effect to the Zaharoff benefaction, and that the College have requested the Air Council to second from year to year one or more members of the staff of the Meteorological Office to act as full time lecturers or instructors.

There are many reasons that make it desirable to retain close co-operation between the proposed School of Meteorology and the Meteorological Office and, in addition, the Council are desirous of assisting in every possible way the advancement of a science which is so closely connected with the interests of aviation. The Imperial College have been informed, therefore, that, subject to their Lordships' approval, the Council are willing to second members of the staff of the Meteorological Office as proposed, on the understanding that whilst performing the duties their salaries will be defrayed by the College and will not fall upon Air funds.

In view of the nature of the duties upon which the seconded officers will be engaged, the Council are of opinion that their service under the College should count as service with the Meteorological Office for purposes of increment and superannuation; and I am to ask their Lordships' sanction for this.

Assuming, as is probable, that the officers selected will be members of the professional staff, who are subject to the Universities scheme of superannuation, it is proposed that they should pay to the superannuation fund such amount (5% of salary) as they would have contributed had their service been in the Meteorological Office and that the corresponding Government contribution (10% of salary) should be recovered from the College.

It will be necessary to provide for the duties in the Meteorological Office of the absent officers, and I am to ask that their Lordships will also give their sanction for the creation of acting posts on the grades of the officers seconded during the period of their absence.

As the Imperial College are anxious to open the School of Meteorology at an early date, I am to ask that consideration may be given to the foregoing proposals as soon as possible.

I am, etc.,
H. McANALLY

The Secretary,
H.M. Treasury.

The Director was authorised, as a temporary measure, to send Miss Austin to South Kensington to help Sir Napier Shaw with the work of the School of Meteorology.

Geophysical Observatory at Lerwick.—Reported—a letter from the Treasury (File 30,264) sanctioning the proposal to regard the staff of Edinburgh, Eskdalemuir, Aberdeen and Lerwick as interchangeable. The Director was authorised not to proceed with the development of the station at Aberdeen, the staff sanctioned for

Aberdeen to be used for developing the station at Lerwick, subject to the final approval of the Establishment Branch. It was further suggested that the Director should consult the Establishment Secretariat, and endeavour to obtain similar Treasury sanction to interchange staff at English stations.

Increase in Establishment.—It was agreed that the Director should reconsider the proposals for increase in establishment at Headquarters, with a view to reduction (M.O. 35403).

864. ESTIMATES. A draft of the estimates under Vote 8G was circulated. It was emphasised that the amount of the estimates under this heading would depend to some extent on the requirements of Civil Aviation, Royal Air Force, and Admiralty.

Bermuda and Ascension.—(Minutes 829 and 831).—The Hydrographer agreed that for the coming financial year no provision of personnel for Ascension need be made, provided the station were supplied with instruments, but urged that the station at Bermuda should be started as soon as possible, in view of the increasing number of ships using the Panama Canal.

Telegraphic Reporting Stations.—It was agreed that no general increase of emolument should be made to observers at telegraphic stations, but that any applications for increase should be considered on their merits. The Committee recognised that it might be necessary in some cases to choose between increasing the emoluments of the observer and having the observations discontinued.

Weather Messages from Ships at Sea.—It was agreed that the estimated expenditure under this heading, to be included under "Telegrams and Telephones," should not exceed £1,500.

865. OFFICE STAFF.—Seniority of Professional Staff (Minute 848).—Reported—the receipt of the following letter from the Treasury (File 171843/20):—

E. 298. 346725.

Treasury Chambers,

7th October, 1920

Sir,

I have laid before the Lords Commissioners of His Majesty's Treasury your letter of the 24th August (171843/20/S.1.) containing certain proposals with regard to the new scales of pay for the professional staff of the Meteorological Office.

In reply, I am to request you to inform the Air Council as follows:—

(1) My Lords are unable, in view of their regularly established practice, to assent to the principle that officers placed on improved scales should be allowed to count past service in their respective grades for purposes of increment. The apparent anomalies to which the Air Council draw attention are due solely to the substantial increase in the general rate of remuneration, and they would not feel justified, in any but the most exceptional circumstances, in sanctioning special increases in addition to the general increase. They are prepared, however, to waive their established rule in view of the long service of Mr. F. J. W. Whipple, and to sanction the grant to him of an immediate increment on his new scale.

(2) In their Lordships' view, the case of the Royal Air Force or Royal Engineers' officers demobilised on the 1st January last does not call for any special treatment. In their letter of the 16th January last (52589/19) my Lords sanctioned, as a very special measure, the grant in respect of uniformed Meteorological service of increments on the lower scales then in operation, but they observe that under the revised scales the position of all the officers concerned has been materially improved. They are of opinion accordingly that a continuance of the concession in relation to the new and more generous scales cannot be justified.

(3) With regard to paragraph 7 of the letter under reply, my Lords desire to be furnished with a statement showing the payments made to each officer concerned in excess of the then existing sanctions.

I am, etc.,

R. R. SCOTT.

The Secretary,
Air Ministry.

Seniority of Technical Staff.—Reported—that a similar decision had been made by the Treasury with regard to the seniority of Technical Staff. (File 30265.)

Resignation of Mr. H. D. Grant—Reported—that the resignation of Mr. H. D. Grant as from 1st January, 1921, had been accepted.

Appointment of Superintendent of Navy Services.—It was agreed to offer the post of Superintendent of Navy Services to Lt.-Commr. Garbett. The Hydrographer announced that Lt.-Commr. Carbett's resignation of his commission had been accepted by the Board of Admiralty, and that he would arrive in England early in January.

866. LIBRARY.—Loan of Books from the Library at South Kensington. The Director explained that the present regulations did not permit of books being taken away from the Office at South Kensington. The Committee agreed that books should be lent from the Library to members of the Office Staff, and that the loan of books to members of the public should be at the discretion of the Director.

Presentation of "Excellent" Logs—(Minute 851).—It was agreed that in cases of presentation for "excellent" logs the label should be inscribed:—

Awarded
by the
Meteorological Committee
to
.....
as an acknowledgment of valuable
meteorological observations
(date).

867. PUBLICATIONS.—Permission was given to Commr. Brooke-Smith to publish a book on *Meteorology for Young Seamen*.

Copies of the following publications issued since the last meeting were laid upon the table:—

M.O. 123. **Meteorological Charts** of the Southern Ocean between the Cape of Good Hope and New Zealand.

M.O. 204g. **Réseau Mondial 1910.**

Fifteenth Annual Report of the Meteorological Committee to the Lords Commissioners of His Majesty's Treasury.

M.O. 232j. **Professional Note No. 10.** Methods of Computation for Pilot Balloon Ascents. J. S. Dines, M.A.

M.O. 240a. **Professional Note No. 11.** Notes on the Ground Day Visibility at Cranwell, Lincolnshire. W. H. Pick, B.Sc.

M.O. 240b. **Professional Note No. 12.** An Analysis of the Rate of Ascent of Pilot Balloons at Butler's Cross, Salisbury Plain. R. P. Batty, B.A.

M.O. 223. **The Computer's Handbook.** Section II., Sub-section I. The Computation of Wind Components from Observations of Pilot Balloons and Shell Bursts. (2nd edition.)

The Meteorological Office Circular. June, 1916—February, 1920. Classified Index.

Proofs of the following were laid on the table:—

M.O. 239. **Report of Proceedings of the Fourth International Conference, Paris, 1919**

M.O. 223. **The Computer's Handbook.** Introduction.

Authority was given for the publication of the following:—

Geophysical Memoir.

Hurricanes and Tropical Revolving Storms. Mrs. E. V. Newnham, M.Sc., with a Preface and an Introduction by Sir Napier Shaw, F.R.S.

Professional Notes.

Lizard Balloons.—L. F. Richardson, B.A.

Cracker Balloons.—L. F. Richardson, B.A.

Use of Light Filters in the observation of Pilot Balloons.—R. A. Watson Watt, B.Sc.

Notes on Meteorology for the Use of Gunners.—D. Brunt, M.A., and J. Durward, M.A.

868. **DIRECTOR'S REPORT AND ACCOUNTS.**—**Transfer of Naval Meteorological Service** (Minute 820).—As from 12th August, 1920, the responsibility for administration of the Admiralty Meteorological Service was transferred to the Director of the Meteorological Office. The Division will be known as the "Navy Services" Division.

Three members of the professional staff and eight of the clerical staff have been transferred to the Meteorological Office.

Metropolitan Water Board (Minute 799).—Arrangements have been made with the Metropolitan Water Board by which the Meteorological Office undertakes certain services in consideration for which a payment of £200 per annum is made by the Board.

The services are as follows :—

- (1) A monthly report on the rainfall of the Thames and Lee Valleys, etc.
- (2) An annual inspection of gauges belonging to the Board.
- (3) The records taken at the Board's gauges to be published in *British Rainfall*.
- (4) Nine free copies of *British Rainfall* and *Symons's Magazine*.

Monday Discussions (Minute 835).—At the request of the Director, Sir Napier Shaw, Professor of Meteorology in the Imperial College of Science and Technology, has undertaken to continue the series of meetings for the discussion of important contributions to meteorological literature, particularly those by Colonial and Foreign meteorologists.

The dates arranged for the meetings are the following Mondays at 5 p.m.—

1st November, 1920.	24th January, 1921.
15th November, 1920.	7th February, 1921.
29th November, 1920.	21st February, 1921.
13th December, 1920.	7th March, 1921.
10th January, 1921.	21st March, 1921.

International Meteorological Committee.—A letter signed by the President (Sir Napier Shaw), the Vice-President (Mons. A. Angot), and the Secretary (Prof. E. van Everdingen) has been circulated to the members of the International Meteorological Committee and to the Presidents of the various commissions suggesting that a meeting of the Committee should be held in London during the week beginning 12th September, 1921.

Commission for Meteorological Telegraphy (Minute 859).—Arrangements have been made for the Commission for Meteorological Telegraphy, under the Presidency of Lieut.-Col. Gold, to hold a Conference in London during the week commencing 22nd November.

The Commission will be concerned chiefly with the following subjects :—

- (1) Meteorological Codes. General Form of messages, including reports special to aviation and upper air reports. Specification of telegraphic scales for wind, visibility, past and present weather, etc.
- (2) The Organization and issue of meteorological telegrams by W/T for international purposes.

(3) The transmission of reports from Iceland, Greenland, Jan Mayen.

(4) The issue of reports by wireless telegraphy or telephony to aircraft in flight.

Representatives from the following countries, Denmark, France, Holland, Iceland, Italy, Norway, Spain, Sweden, and Switzerland have signified their intention to attend.

New Stations.—Cattewater.—A civilian meteorological distributive station was established at Cattewater on 11th August, 1920. Mr. C. D. Stewart, Assistant Superintendent, has been posted to the station as Meteorologist in Charge.

Flamborough Head.—A reporting station was established at Flamborough Head Coast Guard Station on 19th August, reporting six times daily by telegraphy to the Meteorological Office, Howden.

Grain (Minute 814).—A civilian meteorological distributive station was established at Grain on 4th October, 1920.

Marine Sub-Committee.—The Director reported that at the last meeting of the Marine Sub-Committee on 21st October, the report of the Code Sub-Committee (Minute 855) was considered, and a new and simplified code was approved for weather messages from ships at sea.

It was agreed that it is desirable to consider the question of observations at sea from the point of view of the seaman as well as from that of the meteorologist, and the Committee desired the Director to arrange that if possible the Hydrographer should be asked to explain the code from the sailor's point of view to the *International Conference on Weather Telegraphy* on 22nd November.

ONE HUNDRED AND SIXTH MEETING.

Air Ministry, Kingsway, W.C.2.

24th November, 1920.

PRESENT :

THE CONTROLLER-GENERAL IN THE CHAIR.

THE DIRECTOR.

CAPTAIN HARVEY.

LT.-COL. LEWIS.

COLONEL LYONS.

MR. MCANALLY.

MR. MEADOWCROFT.

SIR T. H. MIDDLETON.

DR. WEDDERBURN.

MR. BERTRAM was in attendance.

869. The Minutes 862-868 of the Meeting of 27th October, previously circulated in proof, were confirmed.

870—METEOROLOGICAL COMMITTEE—**Retirement of Sir Napier Shaw** (Minute 862).—The Chairman read the following letter which he had sent to Sir Napier Shaw on behalf of the Committee :—

*Air Ministry,
Kingsway, W.C.2.*

5th November, 1920.

Dear Sir Napier Shaw,

The members of the Meteorological Committee at the last meeting at which you were present took the opportunity of bidding you farewell, but they also wish me to express to you in writing their high appreciation of your past services as Director of the Meteorological Office, and their good wishes for the future.

The Committee are deeply sensible of all they owe to you, for they realise that it is the unique position which your scientific abilities have gained for you in International Meteorology, combined with your great administrative skill, which has placed this country in the van of meteorological progress.

While feeling great regret that your association with them has come to an end, they are very pleased to know that your services will not be lost to the science of meteorology and they trust that your work at the School of Meteorology will be as markedly successful as your work in the past at the Meteorological Office.

May I add a personal note of thanks to you for the very successful way in which you carried through the amalgamation of the meteorological services and the incorporation of the Meteorological Office in the Civil Aviation Department of the Air Ministry.

Yours sincerely,

F. H. SYKES.

Sir Napier Shaw, F.R.S.,
10, Moreton Gardens, S.W.5.

Appointment of Vice-Chairman.—The following letter from Sir Arthur Schuster was read:—

Yeldall,
Twyford, Berks.
1st September, 1920.

Sir,

I am in receipt of your letter of 27th August, and I shall be glad to serve as Vice-Chairman of the Meteorological Committee for the current year.

Yours faithfully,
ARTHUR SCHUSTER.

Representation of the Scottish Departments on the Meteorological Committee (Minute 818).—Reported—the receipt of the following letter from the Scottish Office:—

Scottish Office, Whitehall, S.W. 1.
9th November, 1920.

Sir,

With reference to your letter (B.11304/C.G.C.A.) of the 24th August, regarding the constitution of the Meteorological Committee in London and the Committee for the Meteorological Office in Edinburgh, I am directed by the Secretary for Scotland to state, for the information of the Air Council, that he has furthered considered, in consultation with Departments in Edinburgh, the question whether Scottish Departments should be represented on the main Meteorological Committee in London. As a result he is satisfied that the situation would not be adequately met by the course suggested in your letter; and that the importance of the application of meteorology to the work of Scottish Departments is, in the aggregate, so great as to call for the appointment of an official Scottish representative on the main Committee. It would be the business of such a representative to keep as closely as possible in touch with the various Departments concerned and so to minimise any disadvantage arising from the fact that he would not have an inside acquaintance with the work of all the Departments.

In these circumstances the Secretary for Scotland feels bound to press his request that an official representative of Scottish Departments shall be added to the Committee in London and he trusts that the Air Council will, upon further consideration, be prepared to accede to it.

Subject to a satisfactory settlement of the foregoing question, the Secretary for Scotland is agreeable to action being taken generally upon the lines of your letter under reply.

The Secretary,
Air Ministry.

I am, Sir,
Your obedient Servant,
JOHN LAMB.

It was decided that the Director, Mr. McAnally, and Dr. Wedderburn should, if possible, discuss the matter with the Scottish Office.

Dates of Meeting for the year 1921.—The following list of dates was approved:—

January 26th.	July 27th.
March 16th.	October 26th
April 27th	November 30th
June 22nd	

Reports and Accounts. Programme, Estimates, &c., for 1922-23.

871. FINANCE AND ESTIMATES.—Winding up of the Bank Account.—The Director reported a statement (File 26653/1920) by Mr. J. A. Curtis that the account of the Meteorological Committee with the Bank of England had been closed, and that the balance had been paid over to the Air Ministry, together with the balance of Petty Cash in the Cashier's hands on the 31st March, 1920.

Royal Agricultural Show (Minute 854).—Reported, the receipt of a letter from the Treasury sanctioning the continuance in future years of the Meteorological Exhibit at the Royal Agricultural Show. (File 51297/20.)

Repairs and Maintenance of Eskdalemuir Observatory.—Reported the receipt of a copy of a letter addressed by the Treasury to the First Commissioner of Works, stating that in future the Air Ministry shall be responsible for the maintenance of Eskdalemuir Observatory, and that the expenditure on all repairs shall be chargeable to Air Votes.

Estimates for 1921-22.—The Director submitted a revise of the draft Estimates laid before the Committee at their last meeting. It was decided that an effort should be made to reduce the estimates under Vote 8G to £110,000, and under Vote 5C to £65,000, making a total of £175,000, of which £10,000 would be recovered under Appropriations in Aid.

872. OFFICE STAFF.—Rates of pay of new Women Professional Assistants—Reported the receipt of the following letter from the Treasury :—

E. 298.

Treasury Chambers,
31st August, 1920.

Sir,

I am directed by the Lords Commissioners of His Majesty's Treasury to refer to Treasury letter of the 5th instant (E. 298) further relative to the Professional Staff of the Meteorological Office, and I am to state that they consider that the appropriate scales of salary for new women entrants to the following grades should be as under :—

Senior Professional Assistants	...	...	...	...	£200 — 15 — 300
Junior Professional Assistants	...	...	...	...	£150 — 10 — 200

I am, etc ,

The Secretary,
Air Ministry.

M. G. RAMSAY.

Seconding of Staff for Imperial College.—Reported the receipt of the following letter from the Treasury :—

E. 789.

Treasury Chambers,
11th November, 1920.

Sir,

I have laid before the Lords Commissioners of His Majesty's Treasury Mr. McAnally's letter of the 9th July last (256857/20/S.1) relative to the proposed seconding of officers of the Meteorological Office to act as full-time lecturers or instructors in the School of Meteorology of the Imperial College of Science.

In reply I am to request you to convey to the Air Council Their Lordships concurrence in the proposals and to inform the Council that My Lords agree that officers so seconded may count their service under the College as service with the Meteorological Office for the purposes of increment and superannuation. My Lords also concur in the view of the Air Council that, if the officers selected are members of the professional staff and subject to the Universities' scheme of superannuation, they should while seconded pay to the superannuation fund such amount (5% of salary) as they would have contributed had their service been in the Meteorological Office, and that the Government contribution to the fund (10% of salary) should be recovered from the College.

My Lords also sanction the creation of acting posts in the Meteorological Office on the grades of the officers seconded during the period of their absence.

I am to add that My Lords regret the delay which has occurred in dealing with this matter.

I am, etc.

The Secretary,
Air Ministry.

M. G. RAMSAY.

Seconding of Staff for Porton.—The Director reported a request from the War Office for officers to be seconded for a tour of duty at Porton in connection with Chemical Warfare, and reported that the Treasury had been approached with a view to making the necessary additions to the establishment.

Retirement—The Director reported the retirement of Mr. J. A. Curtis as from 1st November, 1920. The Committee desired the Director to write to Mr. Curtis to express their appreciation of his long and faithful service, and of the help he had given during the transfer of the accounts to the Air Ministry.

873. PUBLICATIONS.—Copies of the following publications issued since the last meeting were laid on the table :—

M.O. 236. **Book of Normals. Section III.**

M.O. 240c. **Professional Notes, No. 13.** Reports on two Pilot Balloon Ascents at Shoeburyness. N. K. Johnson, B.Sc., A.R.C.Sc.

M.O. 240d. **Professional Notes, No. 14.** Tables of frequency of Wind Direction and Cloud Amounts at Metz, Mulhausen, Karlsruhe, and Frankfurt. D. Brunt, M.A., B.Sc.

Proofs of the following were laid on the table :—

M.O. 240e. **Professional Notes, No. 15.** Diurnal Variation in Wind Velocity and Direction at Different Heights. J. Durward, M.A.

M.O. 240f. **Professional Notes, No. 16.** The use of Light Filters in the observation of Pilot Balloons. R. A. Watson Watt, B.Sc.

M.O. 240g. **Professional Notes, No. 17.** Report on the Thunderstorms which caused disastrous floods at Louth on 29th May, 1920. E. V. Newnham, B.Sc.

Authority was given for the publication of the following as Professional Notes:—

Report on the Thunderstorm which caused disastrous floods at Louth on the 29th May, 1920. E. V. Newnham, B.Sc.

The relation between haze and relative humidity. J. Wadsworth, B.A.

874. DIRECTOR'S REPORT.—**New Stations.**—A new Telegraphic Reporting Station was opened at Goswick on October 22nd, 1920.

Visit to Shetland.—The Director reported that he had visited Shetland, but had been unable to visit Edinburgh and Eskdalemuir on account of being delayed by storms in the Shetlands.

International Commission for Weather Telegraphy.—The Director reported that the Code for Weather Messages from ships at sea had been discussed by the Commission, and adopted after slight modification.

ONE-HUNDRED-AND-SEVENTH MEETING.

*Air Ministry, Kingsway, W.C. 2,
26th January, 1921.*

PRESENT :

THE CONTROLLER-GENERAL OF CIVIL AVIATION IN THE CHAIR.

THE DIRECTOR.

MR. MEADOWCROFT.

THE HYDROGRAPHER.

SIR T. H. MIDDLETON.

MAJOR CLAPHAM.

SIR ARTHUR SCHUSTER.

MR. MCANALLY.

DR. WEDDERBURN.

MR. BERTRAM was in attendance.

875. The Minutes 869-874 of the Meeting of 24th November, previously circulated in proof, were confirmed.

METEOROLOGICAL COMMITTEE.—Request for Official Representative of the Scottish Departments (Minute 870).—Mr. McAnally reported that he had visited the Scottish Office, and had found that Office not disposed to withdraw their request except by agreement between the Ministers concerned. The Committee agreed to submit the pros and cons of the case to the Air Council for their decision.

War Office Representative—The Chairman announced the receipt of a letter from the War Office (File B.11304), stating that Major D. Clapham, C.B.E., D.S.O., had been nominated as representative of the War Office on the Committee in place of Lieut. Colonel H. A. Lewis. The Chairman welcomed Major Clapham on behalf of the Committee.

876. **FINANCE AND ESTIMATES.—Estimates.**—A revised draft of the estimates was circulated. The total was shown as £181,149, but this would be reduced if estimate for War Bonus were lowered. On the question of the formation of a Research Fund, Sir Arthur Schuster suggested that if part of the estimates were apportioned as a grant-in-aid, this could be used for research purposes, and the balance would not be handed over at the end of the financial year. It was agreed that this plan might be considered another year.

Gratuities for Voluntary Work.—The Director raised the general question of gratuities for voluntary work. It was pointed out that it would be possible in some cases to make small grants from the Secretary of State's Fund for Extra-Regulation Expenditure, while other cases might be met by the granting of an honour. It was agreed that each special case should be considered on its merits, on the recommendation of the Director. It was also suggested that an Air Council letter should be sent to Prof. Niven expressing their appreciation of the work he had done.

877. **CORRESPONDENCE.—Development Commission.—Advisory Committee on Fishery Research.**—A draft reply to the request of the Development Commission for remarks upon the Interim Reports was submitted and approved. (File 32023.)

Maintenance of the Observatory, Apia, Samoa.—A letter from the Treasury to Admiralty, dated 27th October, 1921, was circulated, and it was decided that the maintenance of the Observatory should be noted in the estimates as borne upon Admiralty votes (File 224718).

Central Meteorological Institute, Vienna.—Letters from the Institute, asking for help in obtaining war material useful for scientific purposes, and in obtaining official recognition of the needs of the Austrian Meteorological Service, were circulated. The Committee agreed that a letter should be sent to the Foreign Office, pointing out the national and international importance of the work done by the Central Meteorological Institute, and by the mountain observatories in Austria, and asking for the guidance of the Foreign Office as to the general policy to be pursued. The Committee was of opinion that any help given to Austrian Science generally should also apply to Meteorology.

878. OFFICE STAFF.—Appointment of Director, Meteorological Office.—The Chairman raised the question of the Director's permanent appointment. He pointed out that Dr. Simpson is at present serving a probationary period of twelve months, but that, in view of the inconvenience to the Government of India in holding Dr. Simpson's Indian post open, he considered that it was desirable to come to an early decision if possible with regard to his being offered a permanent post. The Committee agreed to recommend to the Air Council that Dr. Simpson should now be confirmed in his appointment.

Seconding of Staff for Porton.—Reported, the receipt of a letter dated 13th January, 1921, from the Treasury, authorising the seconding of officers of the Meteorological Office to the War Office Experimental Station at Porton, and sanctioning, during the continuance of these arrangements, the addition to the establishment of the Meteorological Office of posts equal in number and grade to those of the seconded officers. The Director reported that Mr. N. K. Johnson, Senior Professional Assistant, had already taken up duty at Porton, and that arrangements for the appointment and seconding of Mr. O. F. T. Roberts, of Sidney Sussex College, Cambridge, were in progress.

School of Meteorology, Imperial College of Science.—The Director reported that the Treasury had sanctioned the seconding of a Professional Assistant to act as Assistant to the Professor of Meteorology, and had sanctioned the addition to the establishment of the Meteorological Office of an acting post of the same rank. The Director reported that Miss Austin had been seconded for a period of one year as from 11th November, 1920.

The Director reported that the Air Ministry had granted permission to Captain D. Brunt to deliver a course of lectures in the School of Meteorology.

879. PUBLICATIONS.—Copies of the following publications, issued since the last meeting, were laid on the table :—

British Rainfall, 1919.

M.O. 213—Calendar for 1921.

M.O. 239—Report of the Fourth International Conference, Paris, 1919.

M.O. 229f—Hourly Values from Autographic Records, 1917.

Authority was given for the publication of the following :—

As Professional Notes :

Upper Air Observations at Benson, 3rd March, 1920.—E. G. Bilham, B.Sc.

Note on the Prediction of Winter Thunderstorms.—E. V. Newnham, B.Sc.

A Comparison of Minimum Temperatures for the periods 17 h. to 9 h., and 17 h. to 17 h.—M. A. Giblett, M.A.

As a Geophysical Memoir :

Simultaneous Values of Magnetic Declination at different British Stations.—Dr. Chree, F.R.S.

The Director submitted for discussion as to the most suitable form of publication or disposal :—

Gazetteer of Meteorological Stations of First, Second and Third Order, by Dr. H. N. Dickson.

It was agreed that the preface, either in its present form or amended, should be duplicated for circulation with a letter stating that the Gazetteer was available for reference in the Meteorological Office Library.

880. DIRECTOR'S REPORT.—Marine Sub-Committee.—The Director reported that the code for weather messages from ships at sea, together with draft instructions for the use of the code, had been approved by the Marine Sub-Committee, and that it was proposed to try the code on a small number of selected ships. A report of the trial will be submitted to the Meteorological Committee at a later date.

ONE HUNDRED AND EIGHTH MEETING.

*Air Ministry, Kingsway, W.C.2,**16th March, 1921.*

PRESENT :

THE CONTROLLER-GENERAL OF CIVIL AVIATION IN THE CHAIR.

THE DIRECTOR.

COLONEL LYONS.

THE HYDROGRAPHER.

MR. McANALLY.

MAJOR CLAPHAM.

MR. MEADOWCROFT.

MR. FLOOD.

SIR T. H. MIDDLETON.

CAPTAIN HARVEY.

SIR A. SCHUSTER.

DR. WEDDERBURN.

MR. BERTRAM was in attendance.

The Minutes 875-880 of the Meeting of 26th January, 1921, previously circulated in proof, were confirmed.

881. BRITISH RAINFALL ORGANIZATION.—Professional Work.—The Director explained that so long as the Rainfall Organization was a private concern, the head of the Organization acted as an expert adviser on matters involving rainfall, and received fees for such work. In cases involving litigation, the head of the Organization was frequently retained by one side.

The question was now raised as to whether a Government servant can give an expert opinion as against a statement of fact. It was recognised by the Committee that outside the Meteorological Office there are at present no experts on rainfall questions, and that it was to the public interest to provide a means whereby information should be made available to the public, the Superintendent acting as an expert adviser so long as this course of action interferes with no vested interest of outside experts. Fees would be charged for information supplied, and for the Superintendent's time in cases where his presence was required in Court or elsewhere, such fees being credited to Appropriations-in-Aid. It was decided that a memorandum on the subject should be submitted to the Treasury, with a view to obtaining a ruling as to the propriety of a Government servant acting as expert adviser.

Subscriptions to the British Rainfall Organization—The Director explained that in the past subscriptions were paid by private persons towards the expenses of the Organization. Recently subscribers have had the option of receiving publications of value up to the amount of their subscriptions. The Committee decided that it was no longer advisable to accept such subscriptions, and that any subscriptions received in future should be returned to the donors. It was decided to obtain a ruling from the Treasury as to the disposal of the money in hand, and to inform subscribers of the use to which the money would be put.

882. MARINE SUB-COMMITTEE.—A memorandum by the Superintendent of the Marine Division was circulated, recommending the appointment of a representative of the Mercantile Marine on the Marine Sub-Committee. The Committee agreed to this, and asked the Director, in consultation with the Hydrographer and Captain Harvey, to recommend a suitable representative to the next meeting of the Committee.

883. CORRESPONDENCE.—Maintenance of the Observatory, Apia, Samoa (Minute 877). A letter from the New Zealand Government Office was circulated stating that it had been decided to close the Observatory. The Treasury having previously decided that it is not possible to supply from Imperial Funds more than £800 of the £4,000 estimated as necessary for the maintenance of the Observatory, the Committee decided that no further action could be taken towards maintaining the Observatory.

Eskdalemuir Observatory—The Director read a letter received from the Office of Works announcing that there was some danger of a Generating Station being erected in close proximity to the Observatory of Eskdalemuir, in connexion with the Airdrie and Coatsbridge Tramways Trust. It was decided that the Director be asked to take all possible steps to prevent interference with the work of the Observatory.

884. PUBLICATIONS.—Copies of the following publications issued since the last meeting were laid on the table :—

M.O. 242. **Report of the Proceedings of the Third Meeting of the Commission for Weather Telegraphy, November 22nd-27th, 1920.**

M.O. 223. **Computer's Handbook.** Introduction. (2nd edition).

The following were authorised for issue :—

As Professional Notes.

Comparison between Dry Bulb Temperatures in the Climatological Screen at Valencia Observatory, and a Stevenson Screen exposed in an open field, by L. H. G. Dines.

On the relation of Bumpiness to Lapse Rate of Temperature at El Khanka, near Cairo. July 27th to August 3rd, 1920.

As a Geophysical Memoir.

Observations on Radiation from the Sky, and an attempt to determine the Atmospheric Constant of Radiation, by W. H. Dines, F.R.S.

1921-1922.

SEVENTEENTH YEAR OF THE METEOROLOGICAL COMMITTEE.

ONE HUNDRED AND NINTH MEETING.

*Air Ministry, Kingsway, W.C.2.**22nd June, 1921.*

PRESENT :

THE CONTROLLER GENERAL OF CIVIL AVIATION IN THE CHAIR.

THE DIRECTOR.

MR. McANALLY.

THE HYDROGRAPHER OF THE NAVY. MR. MEADOWCROFT.

CAPTAIN FULTON.

SIR ARTHUR SCHUSTER.

COLONEL LYONS.

DR. WEDDERBURN.

CAPTAIN BRUNT (Secretary).

MR. BERTRAM was also in attendance.

Letters of apology for absence were received from Lt.-Col. Clapham, Sir Thomas Middleton, and Mr. Rose.

885. Minutes 881-884 of the meeting of 16th March, previously circulated in proof, were confirmed.

METEOROLOGICAL COMMITTEE.—**Representation of Scottish Office.**—Reported—receipt of a letter from the Scottish Office nominating Mr. P. J. Rose as their representative on the Committee (Min. 875), and nominating the following representatives on the Edinburgh Committee (Min. 861):—

Sir Robert Greig, M.C., LL.D. for the Board of Agriculture for Scotland.

Commander Leslie D. Fisher, D.S.O., R.N. (Retd.), for the Fishery Board for Scotland.

Sir W. L. Mackenzie, M.D., LL.D., for the Scottish Board of Health.

Representation of the Board of Trade.—Reported—the receipt of a letter from the Board of Trade (File 113872/21) announcing the retirement of Captain Harvey and nominating Captain D. Fulton to succeed him as their representative on the Meteorological Committee.

It was decided that a letter should be sent to Captain Harvey expressing the thanks of the Committee for the services rendered by him.

Appointment of Secretary.—The Chairman announced that he had nominated Captain D. Brunt as Secretary of the Committee in accordance with the terms of appointment of the Committee (Min. 838).

886. CENTRAL METEOROLOGICAL INSTITUTE, VIENNA.—**Grant of War Material.**—Reported—the receipt of a letter from the Foreign Office stating that the Conference of Ambassadors had granted the request of the Central Meteorological Institute, Vienna, for War material to be used for scientific purposes, except the two aeroplanes asked for, all aeroplanes in Austria having been destroyed. (Min. 877).

Request for Computing or Scientific Work.—Reported—receipt of a circular letter from the Central Institute asking for computing or other work (File 1731/21). The Director stated that it was not possible to grant the request.

887. **CORRESPONDENCE.—Maintenance of Observatory at Apia, Samoa.**—(File 224718/20 and Min. 883).—It was reported that the Government of New Zealand will undertake to maintain the Observatory at Apia, Samoa, for two years from April 1921, at a cost of £1,600 per annum, provided the Imperial Government contribute £800 per annum. The Hydrographer stated that the Treasury had sanctioned the payment of £800 per annum, to be borne on the Navy Vote, but no decision had yet been obtained as to whether the grant should date from April 1921, or from Jan. 1920, when the Observatory was first taken over by the New Zealand Government.

Amundsen's Polar Drift.—The Director reported (File A. 18887) that the plans of the expedition had been considerably modified but that, although the establishing of the station at Lerwick had been pushed forward in order to co-operate with the expedition, no change of policy with regard to Lerwick was called for.

888. **OFFICE STAFF.—Payment for Work at Unusual Hours.**—The following letter from the Treasury was read :—

TREASURY CHAMBERS.

3rd May, 1921.

E. 4242.

SIR,

I have laid before the Lords Commissioners of His Majesty's Treasury Mr. McAnally's letter of the 8th March (248812/20/S.1.) relative to the remuneration of members of the professional staff of the Meteorological Office who performed duty at night and on Sundays, and at specially early and late hours.

In reply I am to request you to inform the Air Council that after a careful consideration of the circumstances My Lords are of opinion that they would not be justified in sanctioning payment to the professional staff for these duties. The obligation to work at unusual hours of the day and night is a necessary incident of the Meteorological Service, and the scales of remuneration recommended by the Committee on the salaries of scientific and technical officers and approved by Their Lordships are designed to cover all the exigencies of the work. My Lords regret therefore that they are unable to sanction the special rates proposed in the letter under reply.

I am, etc.,

M. G. RAMSAY.

The Secretary,
Air Ministry.

The Committee decided that a letter to the Treasury should be drafted pointing out that the question of night work had never been put before Sir Thomas Heath's Committee when the scale of salaries was considered, but before despatch the letter should be discussed informally by the Director with Sir George Barstow, K.C.B., of the Treasury.

Professional Advice on Rainfall.—A letter was read from the Treasury (File 2195) agreeing that the Superintendent of the Rainfall Organization should be permitted to give expert advice to the public, the scale of fees determined by the Committee appointed for the purpose to be submitted to the Treasury before further action is taken.

Pooling of Staff at Out-stations.—The following letter from the Treasury was read :—

TREASURY CHAMBERS.

6th April, 1921.

E/1218.

SIR,

I have laid before the Lords Commissioners of His Majesty's Treasury Mr. McAnally's letter of the 26th January (58390/21/S.2.) relative to the distribution of the staff in the Out-stations of the Meteorological Office.

In reply I am to request you to inform the Air Council that in view of the present abnormal fluctuations of the work at the various stations My Lords are prepared to give authority to the Air Council for one year from the 1st instant to vary the authorised establishment of the Meteorological Out-stations as may be necessary, on the understanding (a) that the total numbers authorised for the various grades at all the stations are not exceeded ; (b) that before staff is appointed to any new station, other than a temporary station which will not continue for more than three months, the specific sanction of Their Lordships will be obtained ; and (c) that all changes in the distribution of the staff under the authority given by this letter will be reported monthly to Their Lordships for covering sanction.

I am, etc.,

M. G. RAMSAY.

The Secretary,
Air Ministry.

889. STATIONS.—**New Distributive Stations.**—The Director reported that in order to meet the requirements of Civil Aviation and the R.A.F., new distributive stations were required at Shotwick and Leuchars, and that a letter had been sent to the Treasury asking for sanction to open these stations (File 3937/21). The Committee approved the action taken.

Falmouth.—The Director submitted a proposal to terminate the Agreement made with the Royal Cornwall Polytechnic Society in 1913 (Min. 405) whereby the Committee maintain the Observatory at Falmouth, by six months notice terminating on Dec. 31st, 1921, telegraphic observations from Pendennis Castle being substituted for those from Falmouth. The Committee agreed that notice should be given terminating the Agreement on 31st Dec., 1921, but that if the Royal Cornwall Polytechnic Society should desire it, the station might be continued as a climatological station, the instruments now installed being left there so long as observations are supplied, provided they are not wanted elsewhere. (File 25570/20).

Port Meteorological Officer, Liverpool.—The Director reported that Lieut.-Commander Lloyd took up duty as Port Meteorological Officer at Liverpool on April 18th, and that Captain Sargeant who acted as Marine Agent at Liverpool retired from that date.

The Committee agreed that a letter should be sent to Capt. Sargeant thanking him for the services rendered by him to the Meteorological Committee.

Stations at Biggin Hill and Renfrew.—The Director reported that a letter had been received from the Treasury (File 58390/21) giving covering sanction for the stations at Biggin Hill and Renfrew.

Eskdalemuir Observatory (Min. 883).—The Director reported that the Airdrie and Coatbridge Tramways Trust had agreed to the insertion in their Provisional Order of a clause safeguarding the Observatory at Eskdalemuir against the acquisition of land within 25 miles by the Tramways Trust.

890. USE OF SHIPS' METEOROLOGICAL LOGS IN LITIGATION.—Copies of Minutes were circulated (File 30544/21) relative to the supply of meteorological information from ships' logs for purposes of litigation. The Director pointed out that such information was frequently supplied to litigants, but in this case the Office had received a log from the S.S. "Khiva" whose owners were one of the parties to the action in question. It was felt that information voluntarily supplied by the "Khiva" should not be used against its owner, as this would directly discourage Captains from submitting logs to the Office.

The Committee agreed to ask the owners of S.S. "Khiva" whether they had any objection to the use of the ships' log in drawing up a report. The Director suggested that if the owners objected, the Office might simply refuse to give any information at all without stating the reason, and without revealing the fact that the Office has the "Khiva's" log. The Committee decided that before this suggestion was acted upon legal opinion should be obtained.

891. LEASE OF 62 CAMDEN SQUARE.—The Director pointed out that the Lease of 62 Camden Square, where the British Rainfall Organization is housed, belongs to the Trustees of the British Rainfall Organization and is held on a yearly tenancy by the Office of Works. The Lease (at £6 per annum) terminates on June 15th, 1944, and the Trustees are prepared to sell it for £900. The purchase of the Lease would avoid a break in the series of observations extending over 60 years which has been made at 62 Camden Square. The Trustees of the Rainfall Organization wish to wind up their affairs and to dispose of the Lease. The Director stated that he was prepared to abandon the observations at 62 Camden Square if the Rainfall Organization could be taken in at Headquarters. The discussion showed that there was no possibility of doing this, either at the Air Ministry or at South Kensington, and the question was left over for further consideration by the Director.

892. **DIRECTOR'S REPORT.—Progress at Lerwick.**—The station has now been opened and the staff consists of one Senior Professional Assistant, two Technical Assistants recruited locally, and a W/T Operator. Meteorological observations are being made, but the magnetic observations have not yet been started as the necessary buildings are not completed.

Progress at Malta.—An appointment as Assistant Superintendent on the staff of the Office has been offered to, and accepted by, Mr. W. A. Harwood. It is proposed to give Mr. Harwood a period of training at Headquarters and then to send him to Malta as Acting Superintendent, to be confirmed as Superintendent if suitable for the work.

Subscriptions to British Rainfall Organization.—The Treasury has decided that the money now in hand shall go to Appropriation in Aid, and refuses to sanction the discontinuance of subscriptions in the future. This is due to a misunderstanding as to what is meant by subscriptions and a letter is being sent explaining their mistake.

Marine Sub-Committee (Min. 882).—The Director, in consultation with the Hydrographer and Captain Fulton, having selected Sir Benjamin Chave as the most suitable representative of the Mercantile Marine on the Marine Sub-Committee, a letter has been sent inviting him to act upon that Committee, and he has accepted.

Foreign Telegrams to be classed as "Service."—Arrangements are being made whereby telegrams interchanged between the meteorological services of Great Britain, Denmark, France, Holland, Italy, Norway, Sweden, and Switzerland, shall be treated as services messages, without adjustment of accounts. (File 152537/20).

Wireless Messages from Ships at Sea (Min. 864).—The Marconi Company and the General Post Office have undertaken to transmit these messages free of charge.

893. **PUBLICATIONS.**—Copies of the following publications issued since the last meeting were laid on the table :—

M.O. 238c. **Daily Readings at Meteorological Stations of the first and second orders, 1920.**

M.O. 204g. **Réseau Mondial, 1910, Charts.**

M.O. 244. **Forecast Code for the abbreviation of Weather Forecasts transmitted by Telegraphy or Radio-telegraphy.**

M.O. 233. **Cloud Forms. 2nd Edition.**

M.O. 240e. **Professional Notes No. 15. Diurnal Variation in Wind Velocity and Direction at Different Heights, by Capt. J. Durward, M.A.**

M.O. 240f. **Professional Notes No. 16. The use of Light Filters in the Observation of Pilot Balloons. R. A. Watson Watt, B.Sc.**

M.O. 240g. **Professional Notes No. 17. Report on the Thunderstorm which caused Disastrous Floods at Louth on 29th May, 1920, by E. V. Newnham, B.Sc.**

Authority was given for the issue of the following as **Professional Notes** :—

"A Minor Line Squall," Capt. M. T. Spence, B.Sc. "The Variation of Wind with Place," Capt. J. Durward, M.A.

The Director submitted a proposal for the publication as a Geophysical Memoir of a discussion by Professor Becker of various observations made at the University Observatory, Glasgow, during a period of 45 years. It was decided that a full list of contents of the paper should be submitted to the next meeting of the Committee.

ONE HUNDRED AND TENTH MEETING.

Air Ministry,
Kingsway, W.C.2.

27th July, 1921.

PRESENT.

<u>Dr. Wedderburn in the Chair.</u>	<u>Captain Fulton,</u>
<u>The Director.</u>	<u>Sir T.H. Middleton.</u>
<u>The Hydrographer of the Navy.</u>	<u>Mr. P.J. Rose.</u>
<u>Lieut. Colonel Clapham.</u>	<u>Captain Brunt (Secretary).</u>

894 Minutes 885-893 of the meeting of 22nd June, previously circulated in proof, were confirmed.

Letters of apology for absence were received from Colonel Lycns, Mr. McAnally, and Sir Arthur Schuster. A letter was read from Captain Harvey thanking the Committee for the letter sent to him on his retirement. (Min. 885).

The Chairman extended a welcome on behalf of the Committee to Mr. P.J. Rose, of the Scottish Office.

Annual Report. Proofs of the Annual Report for 1920-21, previously circulated, were laid on the table. The Committee accepted the Report for presentation to the Air Council. It was agreed that in a future year the question of printing the names of the staff in full should be reconsidered.

895, Stations. The Director reported the receipt of a letter (File 3937/21), sanctioning the transfer of the Meteorological station at Alexandra Park Manchester, to Shotwick, and sanctioning the establishment of a station at Leuchars, with a staff of one Senior Professional

Assistant, and four Assistants, this staff to be provided out of the existing general establishment of the Meteorological Service.

896. Printing and Publications. The Director requested that a small Committee should be appointed to consider the general question of the printing and publications of the Office. It was agreed that a small committee should be appointed, consisting of Colonel Lyons, one representative to be nominated by the Royal Meteorological Society, and one Air Ministry representative to be nominated by the Controller-General of Civil Aviation, the committee to report to the Air Ministry.

Printing of the Minutes of the Meteorological Committee. It was decided that a request should be made for the Minutes of the Committee to be printed as in the past.

Printing of the observations made at Glasgow. (Min.893). It was agreed that Professor Becker's memorandum on the Glasgow observations should be published as a Geophysical Memoir.

New Publications. The following publications, issued since the last meeting, were laid on the table.

M.O. 240j. Professional Notes No.20. The relation of Bumpiness to Lapse of Temperature at El Khanka, near Cairo, from July 27th to August 3rd, 1920.

M.O. 245a. Professional Notes No.21. The structure of the Atmosphere over Benson (Oxon) on 3rd March, 1920, by E.G. Pilham.

897. Maintenance of the Observatory at Apia, Samoa. (Min.887).

The Hydrographer reported that the Treasury had decided that the payment towards the maintenance of the Observatory at Apia, of £800 per annum to be borne on Naval Votes should date from April 1st, 1921. The matter has been reported to the Foreign Office.

METEOROLOGICAL COMMITTEE.

111th Meeting.

-

26th October, 1921.

MEMBERS PRESENT.

The Controller General of Civil Aviation in the Chair.

The Director.

Mr. Meadowcroft.

Lieut. Col. Clapham.

Mr. Rose.

Colonel. Lyons.

Sir Arthur Schuster.

Mr. Mc.Anally.

Dr. Wedderburn.

Captain Brunt (Secretary).

Mr. Bertram was also in attendance.

898. The Minutes of the 110th meeting of 27th July, previously circulated in type-script were confirmed.

Letters expressing regret for absence were read from Sir Thomas Middleton and the Hydrographer. The Hydrographer also reported that he would be absent from England for four months from the end of November, and the Committee agreed that the Admiralty should be asked to nominate a substitute to act on the Committee during his absence.

Printing of the Minutes of the Meteorological Committee (File 35362/21). The Director reported that, in view of the latest Treasury circular, the Minutes could no longer be printed unless a case could be made to satisfy the Treasury that the expense was justified. The Committee agreed that the case for printing should not be pressed, and that henceforth the Minutes should be duplicated in type-script on smooth paper.

899. Reports of the Meteorological Exhibits at the British Association, Edinburgh and at the Royal Agricultural Show, Derby. Copies of these reports were previously circulated, and approved by the Committee. (File 9379/21 and 34004/21).

900. Finance. The following statement of expenditure during the financial year 1920-21, was circulated.

METEOROLOGICAL OFFICE LIABILITIES STATEMENT.

1st APRIL 1920 - 1921.

SERVICE.	Liabilities 1920-21		Expen- diture from 1.4.20 to 31.3.21.	Amount provided for in Air Force Estimates	Variations.	
	Outstand- ing 1.4.20	Incurred since			More	Less.
G.Salaries, Wages, Superannuation.		31,833	31,833	36746		4913
Instruments & Stores.	4700	10,200	12,900	11040	1860	
Rent, Fuel, Incidentals.		1,050	1,050	4546		3496
Buildings.		2,422	1,223	3200		1977
Transport.	)Not)alloca-)ted to)Stations	1,242	1,242	1000	242	
Postage, Telephones etc.		2,000 ^x	2,000 ^x	6700		4700
Auxiliary Met.Sta- tions - Telegrams.		1,292	1,292	1000	292	
Subventions.		405	405	405		
Thunderstorms,) British Rainfall,) Atmospheric) Pollution etc.)		438	438	1812		1374
Superannuation.		1,556	1,556	2080		524
Cover & Mtce. of K.B.Shed.		884	884	2100		1216
Total S.G.	4700	53322	54823	70629	15,806	

* Excludes claims of about £2,000 from the G.P.O. in respect of Telegrams, etc. for years prior to 1920-21. Discussion as to whether they form a proper charge against Post Office Votes or Air Votes is still continuing.

Vote. V.C. x50,000 56,161 6,161.

x Approximate figure.

The Director explained that the saving was largely due to vacancies in the staff not being filled up.

Draft estimates for 1922-23.

Rough draft estimates for 1922-23 were circulated, showing that if no further appointments were made, and no further development of the work of the Office attempted, the estimates would amount to about £130,000, a saving of £32,000 on the estimate for 1921-22.

The Director submitted the following approximate sub-division of the expenditure incurred in carrying out meteorological work for certain Government departments, a percentage of overhead charges being added in under each heading.

Service Aviation	£36,500
Civil Aviation	9,000
War Office	13,000
Navy	5,000
Agriculture and Fisheries	5,000
Public Health (Registrar General)	2,000
Mercantile Marine	7,500
Science and Investigation	29,000
General Public.	37,500
	£144,500

901. Removal of British Rainfall Organisation from 62 Camden Square.

Copies of letters between the Director and Dr. Mill (File 2709/21) were circulated. The Committee agreed to terminate the lease of 62 Camden Square, in view of the urgent need for economy.

902. Marine Sub-Committee.

The Director reported that the Marine Sub-Committee at their meeting on 26th July had recommended the

desirability of a conference of representatives of the Mercantile Marine, to consider the work being done by the Marine Division for seamen, and further to discuss what help can be given to the Meteorological Office by the Mercantile Marine.

The Committee agreed that it was very desirable to hold a 3-day conference.

Commander Garbett (R.N.), Superintendent of the Navy Services Division, was appointed a member of the Marine Sub-Committee.

Meteorological Committee for Scotland.

The Director reported that the various bodies concerned had nominated representatives on the Meteorological Committee for Scotland (Minute 861).

Chairman :-	Dr. G.C. Simpson, F.R.S.
Board of Agriculture for Scotland.	Sir. Robt. Greig, M.C., LL.D.
Fishery Board for Scotland.	Commr. Leslie D. Fisher, D.S.O., R.N.
Scottish Board of Health.	Sir. W.L. Mackenzie, M.D. LL.D.
Royal Society of Edinburgh.	Dr. C.G. Knott, F.R.S.
Royal Society of London.	Prof. R.A. Sampson, M.A. D.Sc.
Royal Meteorological Society.	Dr. E.M. Wedderburn M.A. W.S.
Glasgow University.	Prof. J.G. Gray, D.Sc.
St. Andrews University.	Prof. W. Peddie, D.Sc.

He pointed out that since the Scottish Meteorological Society had been merged in the Royal Meteorological Society, it was recommended that a nomination by the latter Society should be accepted in lieu of a nomination by the Scottish Meteorological Society. The Committee agreed to this suggestion.

The Director reported that a meeting would be held in Edinburgh on November 4th 1921.

903. Publications.

Authority was granted for the printing of the Minutes of the International Meteorological Committee.

The following publications were issued since the last meeting. -

Professional Notes Nos. 23, 24, and 25.

Geophysical Memoirs Nos. 17, 18.

Weather Forecasting in the Eastern North Atlantic.
and Home Waters for the use of Seamen.

Marine Observer's Handbook.

Observer's Handbook 1921.

Weather Map. 5th Edition (reprint of 4th Edition).

Reseau Mondial 1914 (Tables).

904. Directors Report.

The temporary meteorological stations manned by one Technical Assistant, at the Artillery Practise Camps at Fuddon Ness, Fifeshire and Glen Imaal Co. Wicklow, were closed at the end of September. The staff for these stations was provided from the establishment at Larkhill.

A new telegraphic reporting station was opened at Inchkeith on October 24th, to replace the station at Leith.

A new distributive station was opened at Leuchars on September 2nd, 1921.

The period of seconding of Miss F.E.Austin, Senior Professional Assistant, for duty as Assistant to the Professor of Meteorology, has been extended to June 30th 1922.

Permission has been granted to Dr. Chree and Captain Brunt to deliver courses of lectures at the School of Meteorology, of the Department of Aeronautics Imperial College of Science.

The Superintendent of the Rainfall Organisation visited Edinburgh October 5th to 7th, to arrange for the transfer of all Scottish Rainfall stations to the Edinburgh Office.

Arrangements are now in progress for the removal of the Forecast Division from the fourth to the fifth floor.

The Director regretted that through a misunderstanding the instructions of the Committee regarding the case of the S.S. Khiva (Minute 890) had not been followed. Information based on the meteorological logs of other ships in the vicinity had been supplied.

METEOROLOGICAL COMMITTEE.

112th Meeting.

Air Ministry,
Kingsway, W.C.2.

25th January, 1922.

Present.

The Controller General of Civil Aviation in the Chair.

The Director

Mr. McAnally..

The Assistant Hydrographer of the

Navy

Mr. Meadowcroft.

Lieut. Col. Clapham

Sir. T.H. Middleton.

Captain Fulton

Mr. Rose.

Colonel Lyons

Capt. Brunt (Secretary).

905 Minutes 894 - 904 of the meeting of 26th October, 1921, previously circulated in typescript, were confirmed.

Meteorological Committee. (1) The following list of dates for meetings during 1922 was adopted:

January 25th
March 15th
May 24th
June 21st
July 26th
October 25th
November 22nd

(2) Reported - the receipt of a letter from the Hydrographer nominating Captain R.W. Glennie, C.M.G., R.N., Assistant Hydrographer, to act as a member of the Meteorological Committee during the Hydrographer's absence from England. (File B.11304) The nomination was accepted.

Edinburgh Advisory Committee. Reported - the receipt of a letter from the Scottish Office, nominating Mr. J.M. Ramsay, C.B.E., as representative of the Board of Agriculture for Scotland on the Edinburgh Advisory Committee, in lieu of Sir Robert Greig. (File B.11304). The nomination was accepted.

Advisory Committee on Atmospheric Pollution. - On the recommendation of this Committee, the following changes in its membership were adopted:

Dr. Cates, Medical Officer of Health to the Surrey County Council - as a member nominated by the Meteorological Committee:

Dr. Frank Hanxwell - as member nominated by the St. Helens Corporation:

Mr. J. Baxendell, Borough Meteorologist, - as member nominated by the Southport Corporation.

906 Finance and Estimates.

The Director reported that the estimates for 1922-23 could not be submitted until the changes brought about by the Geddes report were known. A table showing the minimum staff with which the present work of the Meteorological Office could be carried on was submitted for the information of the Committee.

Payment for Services rendered to other Government Departments. - Copies of a letter (File 7801/21) from the Air Ministry to the Treasury, asking for a ruling on this question, were circulated. It was reported that no reply had yet been received.

Geophysical Observatory, Lerwick. Copies of correspondence with the Treasury, re the maintenance of the Observatory at Lerwick, were circulated (File 27860/20).

907 Staff.

1. A memorial signed by 48 Assistant Superintendents, Senior and Junior Professional Assistants out of a total of 58 in these grades, protesting "against the appointment of a gentleman outside the British Meteorological Service with a view to filling the vacancy at Malta" was considered. The Director explained that before a candidate for this appointment outside the British Service was considered, each Superintendent was asked if he wished to go to Malta and the possibility of promoting one of the junior grades was considered. The Committee approved the action taken by the Director and instructed him to meet the staff concerned and to explain to them the whole position.

2. The appointment of Mr. W.A. Harwood as Acting Superintendent at Malta was approved.

3. It was decided that Mr. W.H. Dines should be asked to continue as Assistant Director at Benson, for the present, and that the question of the retirement of Dr. Chree should be brought up each year.

4. The Committee agreed to the proposal that Dr. Mitchell should remain in charge of the Edinburgh Office and Eskdalemuir, but that he should reside in Edinburgh and that an Assistant Superintendent should be sent to Eskdalemuir to take charge of the Observatory under Dr. Mitchell.

5. The Director raised the question of the number of staff to be maintained at Valencia, and the Committee decided that the question should be left over in view of the action proposed under Minute 908.

908 Maintenance of Valencia and Irish Telegraphic Stations under the Irish Free State.

The Director raised for discussion the question of what action should be taken with regard to the maintenance of the Irish Stations under the Irish Free State. It was decided to submit to the Colonial Office a statement of the results which had been obtained from these stations in the past, and to ask the Colonial Office for guidance as to future action by the Committee.

909 Office Publications.

The publication of the following papers was approved:-

1. The Variations of Temperature with Wind Velocity and Cloudiness by Capt. J. Durward, as a Professional Note.
2. Comparison of the Wind at Shoeburyness and Maplin Lighthouse by N.K. Johnson and S.N.Sen, as a Professional Note.
3. Particulars of Meteorological Reports issued by W/T in Great Britain, and by the countries of Europe and North Africa.

910 Director's Report.

1. Removal of Forecast Division to fifth floor, 19th December, 1921.
2. Changes in Duties of Assistant Directors.
(See M.O. Orders 1630 of 1st January, 1922).
3. Receipt of a letter from War Office re war-time meteorological needs of the Army. (File S 16177).
4. Closing of Falmouth, 31st December, 1921, and Howden on 22nd December, 1921.
5. Opening of Shotwick, 24th October, 1921, and Andover, 2nd January, 1922.

METEOROLOGICAL COMMITTEE.

One Hundred and Thirteenth Meeting.

Air Ministry,
Kingsway, W.C.2.

15th March, 1922.

Present:

The Controller-General of Civil Aviation in the Chair.

The Assistant Hydrographer of the Navy	Mr. Meadowcroft.
The Director	Sir T.H. Middleton.
Lieut.Colonel Clapham	Mr. Rose.
Colonel Lyons	Dr. Wedderburn.
Mr. McAnally	Captain Brunt (Secretary).

The Minutes of the last meeting, circulated previously, were confirmed.

Advisory Committee on Atmospheric Pollution.

The nomination of Mr. Arnold R. Tankard, F.I.C., City Analyst, to represent the Health Committee, Hull, on the Committee on Atmospheric Pollution, was accepted.

Publications Sub-Committee.

The report of the Sub-Committee on Publications (Minute 896), previously circulated, was approved. It was further agreed that a small Sub-Committee consisting of Colonel Lyons, Mr. McAnally and the Director, should report from the technical and financial point of view, on all papers brought forward to be approved for publication. This Sub-Committee will decide upon the order of priority of the various publications, with reference to scientific merit and availability of funds. Mr. McAnally said that he would go into the question of a definite allotment of funds for Meteorological Office publications, from the main publication fund of the Air Ministry. It was decided that the question of the Réseau Mondial should be referred to this Committee.

The following estimates for 1922-23 were accepted
by the Committee:

ESTIMATES FOR 1922-23 FOR
METEOROLOGICAL SERVICES.

		Estimates	
		1922-23	1921-22
VOTE 8 G.			
1.	Salaries and Wages of Staff	40,622	60,135
2.	Fuel and Light	600	600
	Transport of Personnel	3,400	2,900
	& Equipment	4,000	3,500
3.	Instruments, Equipment & Stores	11,850	17,500
4.	Works Services, including Rents	5,800	7,164
5.	Miscellaneous:		
	Research	2,000	2,500
	Telograms & Cables	7,600	3,000
	Subventions, Fees & other)	3,300	3,605
	incidental expenses)	12,900	9,105
6.	Superannuation:		
	Pensions	2,330	2,396
	University Scheme	1,769	2,200
		4,099	4,596
		79,271	102,000
VOTE V C.			
	Salaries, Bonus and Overtime		
	Payments	50,837	68,667
£		130,108	170,667

VOTE 8 H. APPROPRIATIONS IN AID.

	Estimates	
	1922-23	1921-22
4. Receipts from Meteorological Services.		
Royal Society.	400	400
Inspections & Transport of Instruments }	500	500
Superannuation	562	562
Sale of Instruments	5,000	6,000
Supply of Daily Weather Reports	350	350
Supply of Data, &c.	1,188	1,188
Recoverable Telegrams.	150	-
	8,150	9,000
Transfer from C.A.S.	15,840	-
" " D. of R.	2,890	-
" " War Office.	6,500	-
	33,380	9,000

STATEMENT OF THE DESIGNATION AND NUMBER OF STAFF OF THE
METEOROLOGICAL SERVICE. 1922-23.

	Director	Assistant Director.	Super- intendent	Assistant Supts.	Senior Prof. Asst.	Junior Prof. Asst.	Clerk Grade I	Clerk Grade II	Clerk Grade III	Un- classified	Total
te V C. Headquarters	1	2	9	5	17	7	8	16	56	12	133
te VIII G. Aberdeen							1		2		3
Andover				1				1	2		4
Baldonnel					1			1	2		4
Benson				1				1	1		3
Biggin Hill									2		2
Calshot				1		1		1	3		6
Cattewater					1			1	2		4
Cranwell				1		1		1	3		6
Croydon					1			1	4		6
Edinburgh			1	1	1				5	1	9
Eskdalemuir				1	1				3	4	9
Felixstowe								1	2		3
Glasgow					1				1		2
Grain						1		1	2		4
Holyhead								1	2		3
Kew		1			2	1	1	1	4	4	14
Larkhill					1				4		5
Lerwick					1				2	1	4
Leuchars					1			1	2		4
Liverpool					1				1		2
Lympne					1			1	4		6
Malta			1		1			1	3		6
Porton									3		3
Pulham					1			1	2		4
Renfrew					1			1	2		4
Shoeburyness					1	1		1	11		14
Shotwick					1			1	2		4
S. Farnborough					1			1	2		4
Valencia				1	1				3	2	7
TOTAL:	1	3	11	12	37	12	10	35	137	24	282

913 Director's Report.

1. The Director reported that on January 7th he addressed a meeting of the Headquarters professional staff, and explained the reason for the appointment of a Superintendent for Malta from outside the existing staff of the Meteorological Office (Minute 907).

2. Reported - the receipt of the first annual report to the New Zealand Government of the Observatory at Apia, Samoa, showing that the work of the Observatory is being carried out satisfactorily. (Minute 883).

914 Meteorological Section, R.E.

Colonel Lyons raised the question of the desirability of placing on record the work performed by the Meteorological Section, R.E. on the lines of a publication now available describing the work of the Corps of Signals. The Director agreed to form a Sub-Committee from among those members of the staff of the Office who were officers in the Meteorological Section, R.E., and Lieut. Colonel Clapham undertook to inquire whether any mention of meteorological work will be made in the official Army History of the War.

METEOROLOGICAL COMMITTEE.

One Hundred and Fourteenth Meeting.

Air Ministry,
Kingsway,
London, W.C.2.

24th May, 1922.

Present.

Lord Gorell (The Under-Secretary of State for
Air).

The Director
The Hydrographer of the Navy
Lieut. Colonel Clapham
Colonel Lyons
Mr. McAnally

In the chair.
Mr. Meadowcroft.
Sir Thomas Middleton.
Mr. Rose.
Dr. Wedderburn.
Captain Brunt
(Secretary).

915. The minutes of the 113th meeting, previously
circulated, were confirmed.

A letter was read from Sir Arthur Schuster,
regretting his inability to attend.

Retirement of Sir F. Sykes. The Chairman explained that
on the retirement of Sir F. Sykes, advantage had been taken
of the reduction of the department of Civil Aviation and of
the re-organisation of various sections of the Air Ministry,
to place the Meteorological Office directly under the
Secretary of the Air Ministry for administrative purposes,
and that the Secretary of State had asked him as Under-
Secretary to act as Chairman of the Meteorological Committee.

Colonel Lyons, in proposing that the thanks of the
Committee be given to Sir Frederick Sykes for his services to
meteorology, pointed out that it was largely due to the
skill, tact, and sympathy of Sir F. Sykes that the
Meteorological Office had been absorbed into the Air Ministry
without friction or loss of efficiency, and that the
apprehensions of meteorologists generally as to the future
of British Meteorology under the Air Ministry, had dis-
appeared. The Committee decided that a letter should be
sent to Sir Frederick Sykes thanking him for his services to
meteorology.

Death of Captain Fulton. The Director reported that
Captain D. Fulton, who represented the Board of Trade on the
Committee had died suddenly on March 20th, while on a tour
of duty in Scotland. The Committee decided that a letter of
sympathy be sent to Mrs. Fulton.

Form of the Annual Report. It was decided that the general
form of the Annual Report should not be changed, but that
the names of junior members of the Staff should be omitted
as far as possible.

916. British Rainfall Organization. The draft scheme, and the draft agreement to be signed by any applicant for professional opinion or advice, prepared by the Committee on the Professional Work of the British Rainfall Organization, (File 2195/21), were approved by the Committee, a resolution in favour of charging any subsequent applicants for information already prepared, at the standard rate, being negatived.
917. Kew Observatory. The Director gave an outline of his plans for the future of the Kew Observatory, whereby the magnetic work should be reduced to the testing of instruments and the running of some self-recording instruments, and the Observatory should be developed into a Meteorological Institute, with full facilities for experimental research, including laboratory and workshops. As a first step towards this, it was proposed to remove the aerological work from Benson to Kew, on the retirement of Mr. W.H. Dines. The project was approved by the Committee.
918. Staff:
- Retirement of Mr. W.H. Dines. The Director reported that Mr. W.H. Dines would retire at his own request as from 30th June, 1922, and explained that Mr. Dines had carried out meteorological work in conjunction with the Office since 1905, receiving £200 per annum as honorarium. The Committee decided that a letter expressing their appreciation of his work should be sent to Mr. Dines.
- Regrading of Technical Staff. The proposals of the Treasury with regard to the regrading of the Clerical and Technical Staff were laid on the table. No action was called for until the proposals had been put before the staff through the Whitley Council.
919. British Association 1922 (Hull). Plans for a proposed meteorological demonstration at the meeting of the British Association at Hull in 1922 were approved by the Committee. (File 322716/22).
920. Director's Report.
- Visit to Rome. The Director reported that he had attended the meeting of the International Union of Geodetics and Geophysics in Rome in May, 1922.

METEOROLOGICAL COMMITTEE.

One Hundred and Fifteenth Meeting.

Air Ministry,
Kingsway,
London, W.C.2.

25th October, 1922.

PRESENT.

Sir Arthur Schuster, in the Chair.
The Director. Mr. Meadowcroft.
The Hydrographer of the Navy. Sir Thomas Middleton.
Colonel Lyons. Mr. Rose.
Mr. McAnally. Captain Warden.
Captain D. Brunt (Secretary).

921.

The Minutes of the 114th Meeting, previously circulated, were confirmed.

Letters were read from Lieut. Col. Clapham and Dr. Wedderburn, regretting their inability to attend.

Meteorological Committee.

(1) Representation of the Board of Trade.

Reported, the receipt of a letter from the Board of Trade (File 371762/22), nominating Captain R.C. Warden as the Board of Trade representative on the Committee, in lieu of Captain Fulton, deceased. The Chairman extended a welcome to Captain Warden on behalf of the Committee.

(2) Retirement of Dr. Wedderburn.

Reported, the receipt of a letter from Dr. Wedderburn (File 378927/21), announcing that in view of his appointment as Professor of Conveyancing in the University of Edinburgh, he would be unable to continue as a member of the Meteorological Committee. The Committee expressed the hope that Dr. Wedderburn might be able to continue to act as a member of the Committee, attending only the most important meetings.

(3) Annual Report.

It was agreed that the names of all Superintendents should be deleted from the headings of reports of Divisions, and that the report should be put forward as the report of the Meteorological Committee to the Air Council. It was also agreed that a paragraph should be

inserted in the report expressing the Committee's appreciation of the services of the staff and of the assistance given by the Superintendents to the Director in the preparation of the report. The report was adopted subject to these alterations.

It was agreed that the Director and Mr. Meadowcroft should consider the possibility of altering the title of the Research Fund, and that in future years a paragraph should be inserted in the Annual Report drawing attention to the work carried out under this heading.

922. Advisory Committee for Atmospheric Pollution.

(1) The Committee accepted the nomination of Dr. Margaret Fishenden as a representative of the Department of Scientific and Industrial Research on the Advisory Committee for Atmospheric Pollution.

(2) Annual Report. The Committee accepted the Annual Report, and approved of its being printed, but recommended that inquiry should be made as to the possibility of reducing the number printed by a scrutiny of the distribution lists of the office and the Advisory Committee. In accepting the report, the Committee expressed its appreciation of the work which had been carried out by the Advisory Committee, and in particular of the instrumental improvements and new methods of research developed during the past ten years.

Copies of the covering letter from Sir Napier Shaw, Chairman of the Atmospheric Pollution Committee, were circulated (File 367886/22). It was decided that copies of the annual report should be sent to the Ministry of Health and the Scottish Board of Health for their information, with a covering letter giving extracts from Sir Napier Shaw's letter.

923. Meteorological Exhibits.

The Director reported that a meteorological exhibit had been shown at:-

The Deep Sea Fishery Exhibition, 1922;
The Royal Agricultural Show, 1922;
The British Association, 1922.

Copies of the report of the second of these were circulated to members of the Committee for their information.

924. Staff.

(1) Marine Division. The Director asked that a small Sub-Committee should be formed to investigate certain difficulties with regard to the work of the Marine Division. The Committee agreed, and the Hydrographer, Captain Warden, and Mr. McNally were nominated to act on the Sub-Committee, which will report to the Chairman of the Meteorological Committee, at an early date. The Chairman will then decide whether a special meeting of the Meteorological Committee shall be held to consider the report.

(2) Regrading of the Technical and Clerical Staff.
Copies of letters exchanged between the Treasury and the Air Ministry on the subject of regrading of technical and clerical staff were circulated (File 360317/22). The Director pointed out that the refusal of the Treasury to allow service prior to 1st April, 1920, to count for superannuation entailed some hardship upon certain members of the office staff.

925. Sketch Estimates.

Sketch Estimates, shewn below were submitted and approved.

SKETCH ESTIMATES 1923 - 24.

Meteorological Services.

<u>1922-23.</u>			<u>1923-24.</u>
	1. Salaries and Wages of Staff:		
	Present Staff	37,483	
	Contingency for new C.A. stations	2,000	
40,642			39,483
600	2. Fuel and Light		600
3,400	3. Transport of Personnel and Equipment		3,400
11,600	4. Instruments, Equipment and Stores		7,000
5,800	5. Minor New Works Services, Rents, Repairs and Maintenance of Buildings.		5,800
2,000	6. Research		2,000
7,600	7. Telegrams and Cables	7,000 ^x	
1,800	Miscellaneous Allowances to Observers, &c.	1,800	
1,500	Incidental Expenses	1,518	
			10,318 ^x
	8. Superannuation.		
	Pensions	2,419	
	Government Contributions under University Superannuation Scheme	1,680	
4,058			4,099
79,000			72,700

^x Does not include charges for Telephones, estimated at £932.

SKETCH ESTIMATES 1923 - 24.

Appropriations-in-Aid.

Meteorological Services.

	1923-24		1922-23	
Royal Society		400		400
Sale of Instruments		2,500		5,000
Superannuation		562		562
Inspections	200		200	
Fees and Supply of Data	838		1,488	
Supply of D.W.R.	350		350	
Recoverable Telegrams	150		100	
		1,538		2,138
Contribution from Army Votes in respect of stations &c. maintained for Army purposes:				
Salaries	5,167		4,900	
Kite Balloon	1,500		1,000	
Instruments and Stores	133		600	
		6,800		6,500
		11,800		14,600

926. Training at Kew for Observers at Health Resorts.

The Director submitted a scheme for giving observers at Health Resorts a week's course of training in meteorological observations at Kew Observatory in April, 1923, with a view to maintaining a high standard of observations at the stations (File 352772/22). This was approved by the Committee.

927. War Meteorological Service.

The Director reported that a scheme to meet the requirements of the Army and the Air Force in war was being discussed with the appropriate sections of the Air Ministry. The scheme proposes that officers of the Meteorological Office should be given commissions in the Air Force Reserve, and that the other ranks should be enlisted partly from the Meteorological Office, and partly from outside sources.

928. International Committee for Geodesy and Geophysics.

The Director reported that at the Conference of the International Union of Geodesy and Geophysics held in Rome in May, 1922, the following resolution was adopted: "That it is desirable that in every country there should be at least one observatory making systematic atmospheric electric observations (especially of the potential gradient, earth-air currents, conductivity and number of ions) which are intercomparable among themselves". The Director suggested that Kew Observatory was the most suitable observatory in Great Britain to carry out this work and asked for the approval of the Committee to extend the work on atmospheric electricity at Kew in the direction of the resolution. Approval was given.

929. Purchase of Back Numbers of Meteorologische Zeitschrift for Kew Observatory.

It was reported that the set of Meteorologische Zeitschrift at Kew was incomplete to the extent of the numbers issued during the war. The Committee agreed that it was of the highest importance for the scientific work of the Observatory that the set should be completed, and strongly supported the Director's proposal for the purchase of the missing numbers.

Meteorological Committee.

One Hundred and Sixteenth Meeting.

Air Ministry,
Kingsway,
London, W.C.2.

22nd November, 1922.

Present:

The Under Secretary of State for Air (Duke of Sutherland)	in the chair.
The Director	Sir Thomas Middleton.
The Hydrographer of the Navy	Mr. Rose.
Lieut. Colonel Clapham	Sir Arthur Schuster.
Colonel Lyons	Captain Warden.
Mr. Meadowcroft	Captain D. Brunt (Secretary)

930. The Minutes of the 115th meeting, previously circulated, were confirmed.

A letter was read from Dr. Wedderburn, regretting his inability to attend.

Meteorological Committee.

The Director reported that he had written to Dr. Wedderburn in accordance with minute 921, and had received a reply to the effect that Dr. Wedderburn would continue for the present to act as a member of the Committee.

Advisory Committee for Atmospheric Pollution.

The following were appointed members of the Advisory Committee:

Lieut.Col.E.Gold (Assistant Director), as a nominee of the Meteorological Committee.

Dr.T.L.Bailey, as a nominee of the Advisory Committee.

Edinburgh Meteorological Committee.

The Director reported the death of Dr.C.G.Knott on October 25th, 1922. Dr.Knott has been a member of the Edinburgh Committee since April 1920. The Committee decided that letters of condolence should be sent to Dr.Knott's nearest relative, and also to the Royal Society of Edinburgh, which Dr.Knott represented on the Edinburgh Committee.

931. Staff:

Marine Division. The Committee confirmed the action taken by the Sub-Committee appointed at the last meeting (Minute 924. See File 30671/20).

932. Supply of Publications to members of the Meteorological Committee.

The Director proposed in future to circulate the titles of new publications to members of the Committee, to enable them to choose such publications as were likely to be of interest to them. This was approved.

933. Cost of Daily Weather Reports, Forecasts and General Supply of Information.

The following resolution was adopted:

"The Committee considers that meteorological information should be supplied to the public at the rates hitherto in force, in so far as the inquiry is not for purely professional or commercial purposes."

934. Measurement of Rainfall in the work of the British Rainfall Organisation.

The following resolutions were adopted:

(a) "In the work of the British Rainfall Organisation measurements of rainfall may be recorded in inches."

(b) "In view of the importance of the C.G.S. units, especially in scientific work, rainfall totals should continue to be given both in inches and millimetres in Part III of the annual volumes of British Rainfall."

935. Visits of Professional Staff to foreign Meteorological Institutes for periods of Training.

The Director raised the question of sending a member of the professional staff to Bergen for a period of training in the Norwegian methods of forecasting. The Committee agreed that it was highly desirable.

936. Dates of Meetings in 1923.

The following dates of meetings in 1923 were adopted:

January 17th
March 21st
May 16th

July 18th
September 19th
November 21st

METEOROLOGICAL COMMITTEE

One Hundred and Seventeenth Meeting.

Air Ministry,
Kingsway,
London.W.C.2.

21st March, 1923.

Present

Sir Arthur Schuster,	in the Chair.
The Director	Mr. L.V.Meadowcroft.
The Hydrographer of the Navy	Sir Thomas Middleton.
Lieut.Colonel Clapham	Mr. P.J. Rose.
Mr. J.E.W.Flood.	Captain R.C.Warden.
Mr. McAnally	Dr. E.M. Wedderburn.
Capt.D.Brunton.	(Secretary)

937. The minutes of the last meeting, previously circulated, were confirmed.

938. Atmospheric Pollution Committee. Its relation to the Meteorological Committee.

A letter from Sir Napier Shaw, Chairman of the Advisory Committee for Atmospheric Pollution, to the Chairman of the Meteorological Committee, together with memoranda by the Director and Sir Napier Shaw, were laid on the table. (File 405225/23). The letter raised the question of the future status of the Advisory Committee, and asked that a Conference might be convened to consider the future organisation of the investigation.

After discussion, it was agreed that the Director should write to the Advisory Committee for Atmospheric Pollution stating that the Meteorological Committee had discussed this matter, and desired as a first step, that the Director and Mr. Meadowcroft should meet the Advisory Committee in order to see what working arrangement could be arrived at.

939. Hurricane Inquiry.

A letter from the Colonial Office (File 372780/22) was circulated. This letter acknowledged the receipt of a copy of Geophysical Memoir No.19, entitled "Hurricanes and Tropical Revolving Storms", and referred to an earlier letter from the Colonial Office dated 12th August, 1918, in which it was suggested that the study of hurricanes and hurricane conditions should be made an imperial matter and dealt with by a central authority.

The Director described the Hurricane Warning Service at present established in connection with the West Indies, the Indian Ocean, the China Seas, and the South West Pacific, and indicated two lines of research; (a) the synoptic method, involving the collection and plotting of observations at a central station; and (b) special investigations, particularly of the upper air, in the hope of elucidating the special conditions which favour the formation of hurricanes. It was pointed out that the synoptic method would be very costly, and could not be carried out without duplicating work already organised, while there was no prospect of any substantial contribution from the Colonies. Upper air observations would cost very little by comparison, since the equipment of a pilot balloon station is cheap.

The Committee decided to write to the Colonial Office pointing out that at present the adoption of an imperial scheme of synoptic investigation is not practicable, and emphasising the fact that full use is not made of the existing facilities, which give reasonable warning of hurricanes; and suggesting that stations for the observation of upper air conditions should be established in regions which are subject to hurricanes. The suggestion that a communication on similar lines should be sent to the West Indian Association was approved.

940. Meteorology in the Crown Colonies.

The Director explained that at present a number of Crown Colonies have meteorological stations, whose observations are printed as Appendices to their Gazettes. The Meteorological Office collects a number of these Appendices, and distributes sets to other offices. It is now proposed to bind sets of Appendices with an introduction, and to distribute them more widely. It would be necessary to point out that the Meteorological Office took no responsibility for the accuracy of the observations.

It was explained that at isolated stations, continuity of observations was at times impossible, and that only in large towns could regular observations be made. The Committee decided that a request for more observations should be made to those Colonies which do not publish observations in their Gazettes, and that a larger supply of the Appendices for the use of the Meteorological Office should be requested.

The Committee approved of the proposal to supply instruments to a Colony where observations are carried out for the Meteorological Office. In other cases, instruments are purchased by the Crown Agents direct from the makers, the Meteorological Office only acting as advisors.

941. Weekly Weather Report.

The Committee approved of the cessation of publication of the quarterly appendices I and II of the Weekly Weather Report. (File 381060/22).

942. British Association 1923, Liverpool Meeting.

The granting of the request made by the British Association for an exhibit at the Liverpool meeting was approved. (File 404341/23.).

943. Publications.

The following papers, submitted for approval for publication, were referred to the Publications Sub-Committee;

Professional Notes.

- F.Entwistle: The Diurnal and Seasonal Variations of Fog at certain Stations in England. (File 350109/22).
- L.F.Richardson: How to observe the Wind by Spheres shot upward. (File 342390/22).
- Various Authors: Abstracts of papers on Visibility. (File 417483/23).

Geophysical Memoir.

- C.Chree: Absolute Daily Range of Magnetic Declination at Kew Observatory, 1858-1900. (File 390882/22).

944. Meteorological Committee: Number of Meetings.

The Director reported that the Statutory number of meetings (six) laid down in the Constitution of the Meteorological Committee had not been held during 1922, and also that one meeting had been cancelled during 1923. It was agreed that when there were no subjects for discussion, meetings might be cancelled, no action being required to change the Constitution of the Committee.

945. Marine Sub-Committee.

The Director reported that a meeting of the Marine Sub-Committee held on March 14th had recommended that the publication of monthly charts by the Marine Division should cease and that an atlas of charts of normal values for each month be published, while the articles now published on the backs of the charts be replaced by a monthly magazine to be called "The Marine Observer". This scheme represents a saving on the present one. The proposal was approved.

946. Apia, Samoa.

The Hydrographer reported that the Observatory at Apia, Samoa, had been provided for financially up to the end of 1924, (Minute 897). As economic conditions are improving in Samoa, it appears likely that, with the help afforded by the New Zealand Government, the Observatory will be kept going permanently.

METEOROLOGICAL COMMITTEE.

One Hundred and Eighteenth Meeting.

AIR MINISTRY,

KINGSWAY, W.C.2.

18th July, 1923.

PRESENT:

Sir Arthur Schuster	in the chair.
The Director	Mr. P.J. Rose
Colonel Lyons	Captain R.C. Warden
Mr. McAnally	Dr. Wedderburn
Sir Thomas Middleton	Captain D. Brunt (Secretary)

947. The minutes of the last meeting, previously circulated, were confirmed.

Meteorological Committee. The Annual Report, circulated in proof, was laid on the table. The Director regretted that sufficient time had not been available for members of the Committee to read the report since it had been circulated in proof. It was agreed that members should send their remarks to the Director, who would consult the Chairman regarding any material changes proposed. Subject to this the Report was approved.

948. Advisory Committee for Atmospheric Pollution.

Further correspondence relating to the status of the Advisory Committee was laid on the table (see Minute 938). It appeared that the Advisory Committee persisted in their request for an enquiry into the whole question of the future conduct of the investigation of Atmospheric Pollution.

It was decided to approach the Air Council with a request for an interdepartmental enquiry into

- (a) the desirability of continuing the investigation of the pollution of the atmosphere and its injurious effects in the urban, suburban and rural districts of Britain and elsewhere; and

- (b) the best method of carrying on the investigation.

949. Course of Training at Kew for Observers at Health Resorts.

The report of the instructor was circulated and approved. The Committee approved of a similar course being held next year. (File 352772/22).

950. Office Staff.

- (1) Death of Mr. Salter.

The Director reported the death of Mr. M. de C.S. Salter, Superintendent of the British Rainfall Organization, on May 21st, 1923. The Committee desired that a letter of condolence should be sent to Mrs. Salter.

The Director reported that he had filled the vacant Superintendentship by transferring Mr. Whipple from the Climatology Division, Mr. Corless being transferred from the Instruments Division to take charge of the Climatology Division. It remains to appoint a Superintendent for the Instruments Division.

The Director proposed that Captain Entwistle, Assistant Superintendent, S.E. England, should be promoted Superintendent to fill the vacancy. It was pointed out that promotions should normally be recommended by a Promotion Board, but that such a Board had not yet been formed for the Meteorological Office. The Director reported that an application for authority to make a promotion to fill the vacancy was being sent to the Treasury and that it was anticipated that some time would elapse before the sanction was received. It was probable that the Promotion Board would have been formed during the interval. The Committee desired to have the recommendation of the Promotion Board laid before it at a subsequent meeting, a special meeting being called if necessary, in order to avoid delay.

(2) Extension of Services of Dr. Chree.

The Committee approved of the extension of the services of Dr. Chree for the year ending May 5th, 1924.

951. Utrecht. Meeting of the International Meteorological Conference, September 3rd - 13th, 1923.

The Committee approved of the proposal that the Director, Dr. Chree and Lieut. Colonel Gold should attend the Conference.

The Committee also approved of the proposal that in view of the unusual circumstances in which Sir Napier Shaw is President of the Conference, his travelling expenses should be paid by the Meteorological Office. It was pointed out that this could probably be met from the Extra-Regulation grant.

952. Exhibit at the British Association, Liverpool.

A proposal to extend the period of the exhibit to September 10th - 22nd, instead of September 12th - 19th as previously arranged, was approved. (See Minute 942).

953. Publication.

The Annual Report of the Advisory Committee for Atmospheric Pollution was referred to the Publications Sub-Committee.

954. Director's Report.

(1) Reported - the opening of meteorological stations each manned by one Technical Assistant, at the Artillery Practice Camps at Okehampton, Trawsfynydd, Buddon Ness, Redesdale, and Wahn (Cologne).

(2) Regrading of Clerical and Technical Staff.

Reported - that out of a total of 170 members of the clerical and technical staff, 120 had been established without examination, 19 were remaining on their former terms of employment, the remaining 31 having undergone an examination whose results had not yet been promulgated.

(3) Marine Sub-Committee.

The Minutes of a meeting of the Marine Sub-Committee held on 18th June 1923, were laid on the table.

METEOROLOGICAL COMMITTEE.

One Hundred and Nineteenth Meeting.

Air Ministry,
Kingsway, W.C.2.

21st November, 1923.

Present:

The Under Secretary of State for Air (The Duke of Sutherland)

In the Chair,

The Director.

Colonel Lyons,

The Hydrographer of the Navy.

Mr. Rose,

Colonel Clapham.

Professor Sampson.

Mr. McAnally.

Captain Warden.

Mr. Meadowcroft.

Captain D. Brunt (Secretary)

956. The Minutes of the last meeting, 18th July, 1923, previously circulated in proof, were confirmed.

Representation of the Royal Society of Edinburgh.
Chairman extended a welcome to Professor R.A. Sampson, Royal Astronomer for Scotland, on his nomination as representative of the Royal Society of Edinburgh in succession to Professor E.M. Wedderburn.

Absences. A letter was received from Sir Thomas Middleton regretting his inability to attend.

The Director reported that Sir Arthur Schuster had lost the sight of one eye through an accident, and would be confined to a dark room for some time. The Committee desired that a letter be sent expressing their sympathy.

Dates of Meetings for 1924. The following list of dates of meetings during 1924 was adopted:

January 9th	July 9th
March 12th	September 10th
May 14th	November 12th

957. OFFICE STAFF.

Extension of Service of Dr. Chree. The Committee approved of the extension of the services of Dr. Chree for another year, until his 65th birthday (May 5th, 1925).

Appointment of Captain Entwistle as Superintendent. The Director reported that the appointment of Captain Entwistle as Superintendent, recommended by the Committee, had now become effective, and that the consequent promotion in lower grades had been made.

958. French Forecasting Methods. The Director explained that the French Meteorological Office had developed a method of forecasting by means of cloud distribution, and suggested sending a member of the Professional Staff to Paris for a month in order to study the method. This was approved.

959. Meteorological Research under vote 6(E)6.
The Director reported that the Treasury had sanctioned the payment of temporary staff with the exception of temporary staff at Headquarters, the purchase of special instruments, and the payment of outside experts from the sum of £2,000 provided in vote 6, subhead E, on the understanding that the expenditure is distinct from the normal expenses of the Meteorological Office (File 425977/23).
960. Pilot Balloon Stations in Hurricane Areas. It was reported that except for Jamaica the West Indian Governments had all sent unfavourable replies to the request that they should set up pilot balloon stations. Jamaica is making provision for a pilot balloon station in the budget for next year, and if this is passed, will set up a station.
- The Committee approved of the suggestion that upper air observations in hurricane areas should be regarded as research work which might legitimately be paid out of the Research Fund of £2,000 under Vote 6E (see minute 959 above) and recommended that in cases where a refusal to set up a station was due to financial considerations, instruments and equipment should be lent (File 373780/22; see also Minute 939 of 21st March, 1923.)
961. Kite Balloons at Shoeburyness. A memorandum by the Superintendent of Army Services on the subject of Kite Balloons was circulated. Colonel Clapham undertook to provide 7 men to put up and take down the Kite Balloon on several days of each week, and with this understanding it was agreed to continue the use of the Kite Balloon at Shoeburyness.
962. Supply of Meteorological Information to Norway.
The Director reported the receipt from the Norwegian Meteorological Service of a request for all the available data for certain days in February, 1923, involving about 30 man-hours, of copying which could only be done by overtime. A ruling was asked on the general question of interchange of scientific data between meteorological services. The Committee recommended that this should be treated as a special case, and that authority should be sought to supply the information gratis.
963. Meteorological Magazine - Distribution List.
The Committee agreed that the free distribution of the Meteorological Magazine to all members of the Professional Staff and Grade I Clerks should be continued, the distribution list being curtailed in other directions.
964. Letter from India Office re s.s. "Okara".
Reported the receipt of a letter from the India Office, asking the Committee to express an opinion as to whether a certain message relating to the storm which sunk the s.s. "Okara" should have been broadcasted. A special sub-committee was appointed consisting of the Hydrographer, Colonel Lyons, Captain Warden and the Director to consider the papers submitted, and to reply to the India Office.

965.

Director's Report.

1. Award of Royal Medal to Sir Napier Shaw. Reported - the award of the Royal Medal of the Royal Society to Sir Napier Shaw. The Committee desired that a letter of congratulation be sent.
2. Advisory Committee for Atmospheric Pollution. Reported - with reference to the proposed enquiry into the future of the investigation of atmospheric pollution (Minute 948 of the 13th July), that no reply had been received from the Treasury, that a representative had been nominated by the Ministry of Health, and that the Department of Scientific and Industrial Research had expressed the view that they could be more helpful by giving evidence rather than by nominating a representative on the Commission of Enquiry.
3. Issue of Wireless Bulletin for Ships at Sea. Reported - the issue of a wireless bulletin twice daily for ships will commence on 1st January, 1924. Copies of a specimen message were laid on the table.
4. The Marine Observer (Minute 945). A proof copy of the first number of the Marine Observer, for January, 1924, was laid on the table.
5. Removal of Benson Observatory to Kew. Reported - the removal of Benson Observatory to Kew on October 5th.
6. Meteorological Exhibit at British Association, Liverpool, 1923. Reported - that a meteorological exhibit had been shown at the British Association, Liverpool, in September, 1923, on similar lines to those of previous years.
7. Utrecht, International Meteorological Conference, September, 1923. Reported - that Sir Napier Shaw, the Director, Dr. Chree and Colonel Gold had attended the Conference.
8. Regrading of Clerical Staff. The following statement of the position with regard to the regrading of the clerical staff was laid on the table :-

Established	Grade	I Clerks	7	
	"	II "	25	
	"	III "	106	138
Unestablished	"	I "	2	
	"	II "	4	
	"	III "	6	12

Clerks remaining on M.O. basis who may be established later :-

Health reasons	1	
Character	1	
Irish residency	2	4

Purely temporary.

M.O.	4	
A.M.	10	
Maltese	1	
Telephone Typists	9	24
TOTAL		178

METEOROLOGICAL COMMITTEE.

One Hundred and Twentieth Meeting.

Air Ministry,

Kingsway, W.C.2.

12th March, 1924.

Present :-

The Under Secretary of State for Air (Mr.W.Leach), in the chair.

The Director

Colonel Lyons

The Hydrographer of the Navy

Mr. Rose

Colonel Clapham

Professor Sampson

Mr. McAnally

Sir Arthur Schuster

Mr. Meadowcroft

Captain Warden

Captain D. Brunt (Secretary).

966

The minutes of the last meeting, 21st November, 1923, previously circulated in typescript, were confirmed.

A letter was read from Sir Thomas Middleton, regretting his inability to attend.

Annual Report of the Meteorological Committee.

(1) The Committee expressed the desire to have the list of staff published at the beginning of the report as in the preceding year.

(2) The Director put forward a tentative suggestion that the Annual Report should be replaced, for one year only, by a general account of the organisation and activities of the whole of the meteorological service. The need for such a publication was strongly endorsed by the Committee, who recommended that it should be published in addition to the usual Annual Report.

967

Advisory Committee for Atmospheric Pollution.
(Previous minutes 938, 948, 965. File 405225/23).

The Director reported that the request made by the Advisory Committee for Atmospheric Pollution for an enquiry into their future status had been refused by the Treasury, and further correspondence showed that the suggestion of a grant-in-aid was not regarded favourably by the Treasury.

The Director stated that although somewhat similar work was being carried out by the Fuel Research Board, and by an organisation of the L.C.C., he considered that the Advisory Committee was doing valuable work in investigating instrumental equipment and obtaining continuous records of atmospheric pollution.

The Committee decided that the Advisory Committee should be informed that the Treasury had refused their request for an enquiry, and that the Meteorological Committee did not propose to pursue the request, and also that the Advisory Committee should be asked to define their aims and in conjunction with the Director to put up a scheme for carrying on their work.

968. Finance.

(1) Statement of Receipts and Expenditure during the year 1922-23.

A complete statement for 1922-23 was circulated. (File 432300/23).

(2) Estimates for 1924-25.

The estimates for 1924-25 were circulated. It was pointed out that these estimates had now been presented to Parliament. The Director explained the difficulty of placing the estimates before the Committee in time for them to exercise any effective control and stated that any suggestion or criticism made now would be taken into account in forming next year's estimates.

969. Kew Observatory.

(1) Proposal to terminate magnetic work at Kew.

The Director explained his proposal to terminate the magnetic work at Kew on the retirement of Dr. Chree. He pointed out that the records obtained at Kew had little scientific value on account of the disturbance produced by railways. The Director stated that the Astronomer Royal had informed him that the new Greenwich station in Surrey would undertake the testing of instruments, and would with Eskdalemuir, Lerwick and Stonyhurst, give a reasonable distribution of recording stations for the British Isles. (File 479365/24).

(2) Proposal to transfer seismological work from Eskdalemuir to Kew.

The Director proposed to replace the magnetic work at Kew by the removal of the seismological work from Eskdalemuir. (File 478625/24). Professor Sampson suggested that a few preliminary records should be obtained at Kew with a Milne-Shaw instrument, for comparison with the Galitzin records at Eskdalemuir.

In a general discussion on the above proposals, the Director stated that it was his aim to develop the Kew Observatory into a Meteorological Institute with special facilities for research, especially on the upper atmosphere, seismology and atmospheric electricity. The proposed changes would be laid before the Gassiot Committee, in view of the conditions attaching to the grant of £400 made by the Royal Society for magnetic work at Kew. It is not anticipated that any objection will be raised to the proposed change in the nature of the work done at Kew.

The Committee expressed general approval of the Director's proposals but asked him to lay before them at their next meeting a memorandum setting out in greater detail the programme of work which would be carried out at Kew if his proposals were adopted.

970. Solar Radiation.

A letter from Dr. C.G. Abbot outlining a scheme for the establishment of a Bureau for investigation of the influence of solar variations on meteorological phenomena was circulated. (File 493262/24). The Committee did not desire to accept the invitation to send a delegate for one year to co-operate in the work of the Bureau.

971. Director's Report.

(1) The Director reported to the Committee the action taken by the Air Council regarding the services of Captain Brooke-Smith, as dealt with on File S.23357.

(2) The Director reported the appointment of Mr. O.F.T. Roberts, Professional Assistant at Porton, to the Cruickshanks Lectureship in Astronomy and Meteorology in the University of Aberdeen.

(3) The Director reported that Dr. Mitchell, Superintendent of the Edinburgh Office, was due to retire on July 1st, 1924, but with the concurrence of the Air Ministry he had agreed to remain on the staff of the Office until 1st October, 1924.

(4) The Director reported that a meeting of the Edinburgh Committee had been held on 4th December, 1923.

METEOROLOGICAL COMMITTEE.

One Hundred and Twenty-first Meeting.

Air Ministry,
Kingsway, W.C.2.

9th July, 1924.

Present :

Sir Arthur Schuster	(in the Chair)
The Director	Colonel Lyons
The Hydrographer of the Navy	Professor Sampson
Mr. McAnally	Captain Warden
Mr. Meadowcroft	Captain D. Brunt (Secretary).

972 The minutes of the last meeting, 12th March, 1924, previously circulated in typescript, were confirmed.

Letters were received from Colonel Clapham, Sir Thomas Middleton, and Mr. Rose regretting their inability to attend.

973 Edinburgh Committee.

The Director reported that the University of St. Andrews had nominated Professor H.S. Allen as a member of the Committee of the Edinburgh Meteorological Office.

Advisory Committee for Atmospheric Pollution.

The Director was nominated a member of the Advisory Committee in lieu of Colonel Gold (Minute 930).

974 Hurricane Enquiry. (Minute 960).

It was reported that active steps were being taken by the Colonial Government to set up a pilot balloon station in Jamaica, but that for financial reasons the Governments of British Guiana, Barbados and Trinidad were unable to establish stations. (File 373780/22).

The Committee approved of the Director's proposal to approach the U.S.A. Weather Bureau to find if there was any locality from which additional observations were required; and to review the whole position in the light of the reply received from the U.S.A.

975 Course of Training at Kew for Observers at Health Resorts.

The report of the instructor of the last course, held April 28th - May 4th, 1924, together with a copy of the syllabus, was circulated to the Committee.

It was suggested that the course should in future years include some training in interpreting forecasts in the light of the later observations generally available at meteorological stations.

Approval was given for holding a similar course in 1925.

Course of Training at Kew for Observers at Crop-Weather Stations.

The Director reported that some two years ago the Agricultural Research Council had appointed a Meteorological Committee to enquire into the collection and treatment of meteorological data in their bearing on crops. This Committee reported in April 1922, and on their recommendation the Agricultural Research Council appointed a Meteorological Sub-Committee to report on methods of using simultaneous crop and weather data. The scheme put forward entails making meteorological observations and observations of the state of crops at 15 or 16 stations employed in agricultural work.

It is proposed to hold a course of training at Kew for 12 observers from these stations. This proposal was approved by the Committee.

976 Kew Observatory. (Minute 969).

The Director submitted a memorandum outlining in detail the work which he proposed to carry out at Kew, and reported that the Gassiot Committee had approved of his proposal.

The Committee approved of the proposals made by the Director.

977 River Temperatures.

The Director laid before the Committee proposals put forward by the Ministry of Agriculture and Fisheries for the observation of River Temperatures (File 514990/24).

The Meteorological Committee approved of the suggestion that while the Meteorological Office should not undertake the primary responsibility for the observations, they would be prepared to give technical assistance to the Ministry of Agriculture.

978 Meteorological Needs of the R.A.F.

The Director outlined the causes which had led up to a detailed enquiry into the meteorological needs of the R.A.F. which he was now engaged upon, together with a representative of C.A.S. (File 493840/24).

- 979 Formation of a Meteorological Reserve to meet the needs of the Army and the R.A.F. in time of war.

The Director reported that the scheme put forward had been approved by the Air Ministry and the War Office. (Minute 927, File S.17887).

- 980 International Geodetic and Geophysical Congress, Madrid, October, 1924.

The Committee expressed the view that in the case of any members of the Meteorological Office staff appointed by the National Research Council as "delegate" at the Madrid Congress, the expenses should be paid by the Air Ministry.

The Committee was of opinion that it was desirable that the Meteorological Office should be represented at the Congress.

- 981 Staff.

Retirement of Dr. Crichton Mitchell. The Director reported that Dr. Mitchell's services would terminate on September 30th. The Committee desired to put on record its recognition of the effective service rendered by Dr. Mitchell as Superintendent of Eskdalemuir Observatory and of the Edinburgh Office.

Promotion of Mr. E.G. Bilham. The Committee approved of the recommendation of the Promotions Board to promote Mr. E.G. Bilham, Assistant Superintendent in the Forecast Service, to the vacancy caused by Dr. Mitchell's resignation.

- 982 Director's Report.

1. Loss of S.S. "Okara". The Director reported the receipt of a letter from the India Office outlining the revised arrangements for broadcasting wireless weather messages in the Arabian Sea and the Bay of Bengal.

The Committee was of opinion that the revised scheme would effect a considerable improvement in the dissemination of meteorological information (File 463120/23).

2. Load Line Committee. The Director reported that he had been invited by the Board of Trade to be a member of the Load Line Committee, which was formed in order to define the winter and summer seasons in various parts of the world, for the purpose of merchant shipping regulations. The report of this Committee had now been submitted to the Board of Trade, and the Board now wrote expressing their indebtedness to the Director for the services he had rendered as a member of the Committee (File 451149/23).

3. The Director reported that stations, each manned by one Grade III clerk, had been opened at the summer artillery practice camps at Okehampton, Buddon Ness, Redesdale, Trawsfynydd and Wahn (Cologne).

METEOROLOGICAL COMMITTEE.

One Hundred and Twenty Second Meeting.

AIR MINISTRY,
KINGSWAY, W.C.2.

12th November, 1924.

Present:-

Sir Arthur Schuster	(In the Chair)
The Director	Sir Thomas Middleton
The Hydrographer	Mr. Rose
Colonel Lyons	Professor Sampson
Mr. McAnally	Captain Warden
Mr. Meadowcroft.	Captain D. Brunt (Secretary).

983 The minutes of the last meeting, 9th July, 1924, previously circulated in typescript, were confirmed.

Correspondence.

A letter was read from Colonel Clapham, regretting his inability to attend the meeting.

A letter was read from Vice-Admiral Learmonth announcing the termination of his membership of the Committee on his retirement from the post of Hydrographer. The Committee desired to put on record their appreciation of the assistance which Admiral Learmonth had given them during his tenure of office, and requested that a letter should be sent expressing this.

The Chairman extended a welcome on behalf of the Committee to Admiral Learmonth's successor, Captain H.P. Douglas, C.M.G., R.N.

984 Advisory Committee on Atmospheric Pollution. (Minutes 948, 965).

A letter was read from Sir Napier Shaw, relative to the future of the Advisory Committee on Atmospheric Pollution.

The Director reported the discussions which had taken place at the meetings of the Advisory Committee, and placed before the Committee the final recommendations as to future working, which had been accepted by the Advisory Committee (File 405225/23). The following resolution was adopted:-

"In view of the changes in the constitution of the Meteorological Office since the institution of the Advisory Committee on Atmospheric Pollution in 1917 (Minute 629) the Meteorological Committee recommends to the Air Council that in the future the work of the Advisory Committee should be conducted in accordance with the following recommendations which have received the concurrence of the Advisory Committee:

(1) The Committee for the Investigation of Atmospheric Pollution exists for the following purposes:-

(a) to obtain reliable records at as many stations as possible of the state of pollution of the atmosphere, so that the conditions at any place may be compared with those of other times and other stations;

- (b) to co-ordinate, supervise and extend the study of atmospheric pollution in all its forms;
 - (c) to trace the origin of the various forms of pollution;
 - (d) to design and develop instruments and methods for prosecuting the abovementioned investigation.
- (2) The Meteorological Office will provide the Committee with facilities for carrying on its work. Investigations involving expenditure will require Air Ministry financial sanction, which will be arranged by the Director of the Meteorological Office on receipt of full particulars of the purpose of the investigation and an estimate of the cost involved.
- (3) Municipal and other local authorities which co-operate in the investigation will maintain gauges at their own expense and undertake full financial responsibility for the work performed at their observing stations.
- (4) The Meteorological Office will maintain a station in London to act as a control station.
- (5) The Committee will
- (a) advise the Meteorological Committee and Local Authorities regarding the methods to be employed in routine measurements of atmospheric pollution and advise on suitable investigations to be undertaken;
 - (b) supervise the work of the local centres and the control station in London and represent to the governing bodies the changes considered desirable;
 - (c) initiate research work and supervise its progress;
 - (d) prepare an annual report for publication by the Meteorological Office, in which the results obtained at the local centres and the control station will be compiled, collated and discussed.
- (6) The Committee will act through a Secretary who will receive an annual honorarium of £100. The Secretary will also be graded as an Honorary Superintendent on the Staff of the Meteorological Office, and in this capacity will be in charge of the research work.
- (7) The Committee shall consist of:-
- (a) The Director of the Meteorological Office (ex officio) Chairman.
 - (b) Members elected by the Meteorological Committee.
 - (c) Members representing Municipal Authorities co-operating with the Committee by the installation and maintenance of one or more gauges and the analysis of the products. These members to be appointed by the Meteorological Committee on the nomination of the several Municipal Authorities concerned."

In the covering letter Sir Napier Shaw pointed out that with the revision of the regulations governing the work of the Advisory Committee on Atmospheric Pollution his tenure of office as Chairman naturally terminated.

The Committee desired to put on record their appreciation of the very valuable work which Sir Napier Shaw had done as Chairman of the Advisory Committee, and decided to invite Sir Napier to continue to give the Advisory Committee the benefit of his advice and assistance as an Ordinary Member.

The Committee further decided that, for the future, all members of the Advisory Committee appointed by the Meteorological Committee should be appointed for a period of 3 years, any retiring member to be open to re-election for a further term of 3 years. With a view to bringing this scheme into operation, the Committee decided that 4 of the existing members should retire in 1926, 4 in 1927 and 4 in 1928, subject to the possibility of re-election in each case. The advisory Committee on Atmospheric Pollution will therefore be constituted as follows:-

Nominated by the Meteorological Committee.

Dr. G.C. Simpson, F.R.S. (Director, Meteorological Office)	
(Chairman ex-officio).	
Dr. T.L. Bailey (Chief Alkali Inspector, Ministry of Health)	} To retire on 1st April, 1926.
Professor H.B. Baker, C.B.E., F.R.S., Royal College of Science).	
Dr. Joseph Cates (Medical Officer of Health to the Surrey County Council)	
Captain C.J.P. Cave (Past President of the Royal Meteorological Society)	
Mr. J.G. Clark, F.I.C. (Chemist, Gas, Light and Coke Co.)	} To retire on 1st April, 1927.
Professor J.B. Cohen, B.Sc., Ph.D., F.R.S. (Professor of Organic Chemistry, Leeds University).	
Dr. H.A. Des Voeux (Hon. Treasurer, Coal Smoke Abatement Society).	
Dr. J.S. Owens (Honorary Secretary)	
Sir John Russell (Director of the Rothamsted Experimental Station, Harpenden).	} To retire on 1st April, 1928.
Sir Napier Shaw, F.R.S.	
Mr. W.B. Smith (Member of Departmental Committee on Smoke Abatement).	
Mr. F.J.W. Whipple (Superintendent, British Rainfall Organisation Meteorological Office).	

Nominated by the Municipal Authorities contributing observations.

Nominated by:

Dr. John Robertson	The Corporation of Birmingham
Mr. A.R. Tankard	" " " Hull
Dr. W. Hanna	" " " Liverpool
Dr. W.T. Howarth	" " " The City of London.
Mr. Henry Mills, J.P.	" London County Council.
Mr. W. Osborn Thorp	" Corporation of Malvern
Professor W. Haldane Gee	" " Manchester
Dr. R.W. Simpson	" " Newcastle-on-Tyne.
Dr. J.B. Wilkinson	" " Oldham
Dr. J.R. Ashworth	" " Rochdale
Dr. Frank Hauxwell	" " St. Helens
Mr. J. Barendell	" " Southport
Mr. John Fyfe	" " Stirling

Nominated by the Department of Scientific & Industrial Research.

Dr. Margaret Fishenden

985. Airship Meteorology

The Director reported that, in connection with coming tests of Airships, meteorological assistance would be required for experimental flights, and the journeys to Egypt and India. He stated that, for the preliminary stages, a special staff consisting of 1 Superintendent, 1 Senior Professional Assistant, and 2 Clerks, Grade III, would be required. These appointments would be temporary in the first place, but if the Airship Service becomes permanent, a larger permanent addition to the staff of the Office would be necessary.

986. The Future of the Radcliffe Observatory.

The Director reported the receipt of a letter from the Radcliffe Observer pointing out that in view of the magnitude of the programme of astronomical work, it was desired to discontinue all meteorological observations which were not of real value. (File 546665/24).

The Committee agreed that the records of photographic recording thermometers and barometer might be discontinued without loss, but that it would be of value to continue the observations with earth thermometers at 1 ft. and 4 ft.

The Director reported the receipt of a further letter from Mr. Knox-Shaw addressed to him personally asking his opinion regarding the proposed change of site of the Radcliffe Observatory from the point of view of meteorology. The Committee did not wish to express an official view on the question, but instructed the Director to reply unofficially.

987. Daily Weather Messages from St. Helena.

Correspondence from the Colonial Office regarding a request from the Union of South Africa for daily meteorological observations from St. Helena was read. The Governor of St. Helena stated that the present observer, who is Chief Clerk to the Government, could not undertake more meteorological work without his work in the secretariat suffering. The Governor was therefore unable to meet the wishes of the South African Government. The Colonial Office proposed to concur in this reply but before communicating it to Cape Town asked for any remarks the Air Council might wish to make.

A draft letter to the Colonial Office pointing out the desirability of daily weather messages from St. Helena was read and approved by the Committee. (File 536119/24).

988. Staff Questions.

Mr. C.E.P. Brooks. The Director pointed out that Mr. Brooks, Assistant Superintendent in the Climatology Division had for some years carried out highly specialised work in climatology and the meteorology of the globe which no other member of the office staff could do so efficiently. He pointed out that the promotion of Mr. Brooks to Superintendent in charge of a division of the Office, with the consequent absorption of his time by administrative work, would make it impossible for Mr. Brooks to continue the very special work he now carries out. This would be a very definite loss to the public service. The Committee agreed that an attempt should be made to obtain Treasury sanction to allow Mr. Brooks,

on attaining the maximum pay of his present grade, to proceed to the scale of salary of a Superintendent, without promotion to the rank of Superintendent of a division of the Office.

Mr. G. M. Watson. The Director reported that Mr. Watson was appointed as chemist to conduct research work on atmospheric pollution, on a temporary basis, renewable from year to year. Mr. Watson is graded as Junior Professional Assistant, and cannot be promoted to Senior Professional Assistant since the establishment only allows a junior post for the work he is doing.

The Committee agreed that an effort should be made to obtain Treasury sanction to pay Mr. Watson at the rate paid to Senior Professional Assistants on his attaining the maximum of his present scale.

989. Annual Report.

The Annual Report of the Meteorological Committee to the Air Council, previously circulated in proof was formally approved.

990. Director's Report.

(1) Meteor Flight at Eastchurch. The Director reported that, with a view to obtaining daily records of upper air temperatures, a meteor flight, consisting of two aeroplanes, with pilots and riggers, had been formed, and was located at Eastchurch. This choice of location would make it possible to abandon work with the Kite Balloon at Shoeburyness.

(2) Artillery Practice Camps. It was reported that the meteorological stations maintained during the summer at Okehampton, Trawsfynydd, Redesdale, Buddon Ness and Wahn (Cologne) were closed at the end of August, on the termination of firing practice.

(3) Manchester Aerodrome. It was reported that the meteorological station at Manchester was closed on 28th August, 1924.

(4) New Telegraphic Reporting Station at Tiree. It was reported that Treasury sanction had been received for the opening of a Telegraphic Reporting Station on the Island of Tiree, to replace the present station at Castlebay, but that difficulty had arisen owing to the want of telegraphic facilities at the proposed site for the station.

(5) Transfer of Fishery Barometers to the Irish Free State. It was reported that 40 fishery barometers had been transferred to the Irish Free State; of these only 20 have been located, the remainder being missing.

(6) Transfer of Fishery Barometers to Northern Ireland. It was reported that 20 fishery barometers had been transferred to Northern Ireland.

991. Dates of Meetings during 1925.

The Committee agreed that meetings should be held on

January	8th
March	11th
May	13th
July	8th
September	9th
November	11th

METEOROLOGICAL COMMITTEE.

ONE HUNDRED AND TWENTY-THIRD MEETING.

Air Ministry,
Kingsway, W.C.2.

11th March, 1925.

Present:

The Under-Secretary of State for Air.	(In the Chair).
The Director.	Sir Thomas Middleton.
The Hydrographer.	Professor Sampson.
Mr. McAnally.	Captain Warden.
Mr. Meadowcroft.	Mr. D. Brunt. (Secretary).

992. The minutes of the last meeting, 12th November, 1924, previously circulated in typescript, were confirmed.

Correspondence.

Letters were received from Colonel Clapham, Colonel Lyons, Mr. Flood and Mr. Rose, regretting their inability to attend.

A letter was read from Vice-Admiral Learmonth thanking the Committee for the letter of appreciation of the help he had given the Committee sent on the occasion of his retirement. (Minute 983).

993. Invitation to Mr. J. Bjerknes of Bergen, to visit the Meteorological Office.

The Committee approved of the Director's proposal to extend an invitation to Mr. J. Bjerknes to visit the Office for a period of six months from the beginning of next winter. The Director suggested that an offer of a payment of £100 per month, together with travelling expenses, should be made to Mr. Bjerknes.

994. Office Staff.

1. Retirement of Mr. J.T. Williams.

The Director reported that Mr. Williams, a clerk in the Marine Division, who joined the office staff as a temporary clerk in 1881, would now retire at the age of 65, after 44 years' service.

2. Airship Meteorology.

The Director reported that the scheme outlined at the last meeting (minute 985) to establish a Division of the Office to deal with the meteorology connected with airship development had received Treasury sanction subject to the status of the head of the Division being reviewed at the end of twelve months. In view of the need for early action Mr. Giblett had been appointed Superintendent (Acting) in anticipation of the approval of the Committee.

Mr. Giblett's appointment was confirmed.

3. Retirement of Dr. Chree and consequent changes.

In noting the retirement of Dr. Chree, Assistant Director, from the post of Superintendent of Kew Observatory, the Committee desired to place on record their high appreciation of the services he had rendered to meteorology and geophysics generally. In particular they desired to record their estimation of the value of his contribution to our knowledge of magnetism. The Committee instructed that a letter should be sent to Dr. Chree in these terms, and expressing the hope that he will continue his magnetic researches, for which the Meteorological Office will give him all possible facilities.

4. Appointment of Superintendent of Kew Observatory.

Mr. McAnally explained that, while the authority of the Meteorological Committee with regard to making the senior appointments to the Meteorological Office was fully recognised, it was necessary to co-ordinate this with the functions of the Promotions Boards recently created under general arrangements entered into with the Staff. After discussing the matter with the Director he had come to the conclusion that the best solution would be for the Committee to consider each vacancy as soon as possible, and then to instruct the Director to place their view before the Promotions Board, of which he is a member. He did not anticipate that any difference of opinion between the Committee and the Promotions Board would arise. If it did, the case would have to be considered further.

The Committee agreed generally with this arrangement.

The question of the status of Dr. Chree's successor at Kew was then considered. The Director stated that he considered that the new Superintendent of Kew should be an Assistant Director, and pointed out that the Assistant Directorship referred to the Meteorological Office as a whole and not to Kew.

The reasons put forward for the Assistant Directorship were the following :-

- (a) The Superintendent of Kew Observatory has always held a high status in the scientific world and it would be a distinct loss to science if this well-known post were reduced to the level of a Superintendent of a Division.
- (b) The Director of the Meteorological Office is so completely absorbed in administrative work that he must have an Assistant Director to take general supervision of the scientific work done in the first class observatories of the Office, namely Kew, Eskdalemuir, Valencia, Aberdeen and Lerwick. If there is not an Assistant Director in charge of this work, scientific questions necessitating considerable reading and study would have to be brought before the Director. This work can only be done by someone with specialised knowledge, with time available, and freedom from heavy administrative work. The Superintendent of Kew Observatory is in a position to undertake this work and responsibility.

Mr. McAnally suggested that the Assistant Directorship had been the recognition of eminence, and that to appoint some

to be Assistant-Director did not make him eminent. He thought the stronger point in favour of the continuance of the post was the necessity for assistance to the Director in the supervision of the scientific side.

The Committee agreed that the Superintendent of Kew Observatory should continue to be an Assistant Director of the Meteorological Office.

The Committee decided that the Director should put forward the name of Mr. Whipple as their nominee for the vacancy at Kew Observatory on Dr. Chree's retirement.

995. Changes in internal organisation of the Office.

(1) The Director explained to the Committee the proposal for redistribution of the duties now carried out by the Forecast Division (M.O.2.) and the Local Centres Division (M.O.6.) to meet the requirements of aviation. This was approved.

(2) The Director proposed that the vacant Superintendency caused by the promotion of Mr. Whipple should be filled by the promotion of Mr. Brooks, now Assistant-Superintendent in the Climatological Division. To meet the difficulties relative to the promotion of Mr. Brooks discussed at the last meeting (minute 988), the Director proposed not to proceed with the scheme of minute 988, but to reorganise the work of the British Rainfall and Climatological Divisions, by replacing them by new divisions, to deal respectively with :-

(a) Climatology of the World, and the Library.

(b) Climatology of Britain, including British Rainfall.

Mr. Brooks would become Superintendent of the first of these, as this division would involve very little administrative work, and would make full use of his special qualifications.

The Committee approved of this scheme.

996. Advisory Committee for Atmospheric Pollution.

A letter from Sir Napier Shaw, relative to the scheme adopted at the last meeting (minute 984) for the future working of the Advisory Committee on Atmospheric Pollution, was circulated.

The Director reported that at a meeting of the Advisory Committee held on January 16th, 1925, at which he had presided, the scheme (minute 984) previously approved by the Advisory Committee was re-discussed, and it was decided to ask the Secretary of State for Air to receive a deputation. It was further reported that in view of his early departure for Iraq the Secretary of State had asked the Under-Secretary of State to deal with the matter.

997. Apia Observatory, Samoa.

A letter from the Treasury to the Colonial Office, suggesting the withdrawal or reduction of the Imperial Grant-in-Aid of the Apia Observatory, Samoa, as from the 1st April, 1926, was circulated. The Committee agreed that a reply should be

sent stating that it would be a serious loss to science if the Samoa Observatory were closed, and trusting that means may be found for continuing its work. (Previous minutes 877, 887, 897, 846).

998. Director's Report.

1. Artillery Practice Camps.

Reported - the receipt of a request from the War Office, for the supply of meteorologists to four Artillery Practice Camps during the coming summer.

2. Weather Shipping Messages.

The Director reported that Treasury authority had been received for the extension of the dissemination of weather shipping messages by broadcasting on spark from four stations.

3. Meteor Flight.

The Director reported that the Meteor Flight had been removed from Eastchurch to Duxford on 9th January, 1925.

4. Meteorology in the Middle East.

A scheme is being considered replacing Royal Air Force meteorological personnel in the Middle East by civilians.

5. Terrestrial Magnetism and Seismology at Kew.

The magnetic work ceased at Kew at the end of 1924. The necessary structural changes are being made for the transfer of the Galitzen seismograph from Eskdalemuir to Kew.